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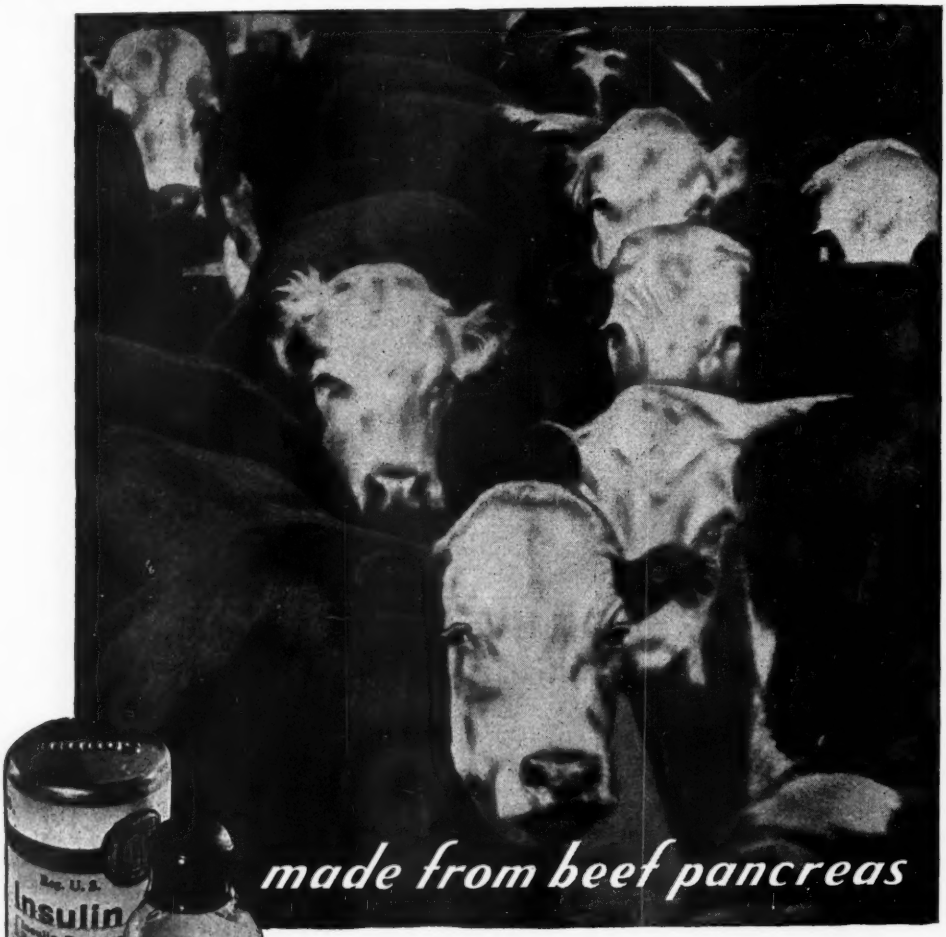

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Editorials

NO SYSTEM OF SICKNESS INSURANCE CAN, IN A DEMOCRACY, DEVELOP INTO ANYTHING BUT A POLITICAL PLAYTHING

Like all communistically inspired bodies and groups, the members of the Milbank Memorial Fund are gloating over the results of socialistic endeavors to flay the medical profession, and hang its hide to dry on the walls of the new socialistic state for which the cornerstone is being laid by such misguided foundations as the Milbank and other highly endowed, unfortunately directed philanthropies.

In a recent issue of the Quarterly magazine issued by the Milbank Memorial fund, I. S. Falk, Ph.D., a research associate of the fund, remarks that:

"There is a vast unrest in American medicine. There is a ferment at work. Physicians, dentists, nurses, hospital administrators, pharmacists and others are conscious of a national uncertainty in the future of medicine.

"It is a common belief that, in respect to organization and social relations, medicine is at a crossroads and has not yet found the signpost . . . A study of experience suggests that, whatever the near future holds, sound planning must rest upon the following basic principles:

1. The provision of good medical care to all the population is essential to the nation's well-being.

2. The costs of medical case should be distributed over groups of people and over periods of time, whether through taxation, insurance, or combinations of the two.

3. Those who render medical care should be adequately remunerated.

4. Quality in medical care should not be sacrificed to economy in cost.

5. The medical care of the dependent and indigent sick is an obligation of society.

6. Group payment of medical costs should be restricted to this purpose and should not be combined with insurance against the loss of wages during a period of illness.

7. Group payment of medical costs should embrace all economic groups in the population to whom the private purchase of medical care brings variable costs which are burdensome and which are incapable of being budgeted on an individual or family basis.

8. The costs of medical care must be distributed according to ability to pay.

9. Group payment of medical costs should be grounded on a compulsory basis.

10. A system of group payment for medical care should not include or permit the operation of proprietary or profit-making agencies or of any independent intermediary between the potential patient and the medical agencies.

Dissecting Mr. Falk's statements in his layman's platform of medicine, there is of course no question about the essentiality of good medical care to the nation's welfare, but who knows what is *"good medical care"* but the doctors?

Good medical care for all the people? Who is going to define it, except medical men themselves, through their professional organizations? As a matter of fact the people of the United States are getting a high quality of medical care at legitimate medical hands. Any other implication is an injustice to a profession that has always given its best—whether the service was paid for or not.

Now the average patient should be made to realize that he has no right to pass by his neighborhood physician who charges moderate fees and gives good service to go to a specialist whose fees, are too high for him to pay. People buy other things according to their means. Why not medical services?

If the neighborhood physician feels that a patient needs more than he can give, he will certainly make arrangements for him to have the best at a cost he can meet. Only an absurdly small percentage of cases really need a specialist's attention.

Yet, "Specialists" are argued for by the laymen out to control medical practice. They howl "overcharge." Yet the public of the United States spends more per year (on each individual item) for cigarettes, cosmetics and moving pictures than for professional services of doctors. This same public insists on medical service that it cannot afford.

Hospitals, insurance companies, municipalities and other governmental units, as well as public health agencies, practice medicine. Doctors do not organize and use lobbies to protect their interests. Doctors, we are told, are poor business men. This would seem to prove it! So certain organizations of laymen feel that they must set things right, and as a profession, doctors must be put in harness because these groups have come to the conclusion that, unaided, doctors can't guide the destinies of medicine along acceptable lines. Yet examination of the experience of mutual aid societies abroad indicates that although they are organized to give financial relief in time of illness, the quality of service is considered purely incidental. No system of sickness insurance can, in a democracy, develop into anything but a political plaything.

The United States has had one grand political plaything in the recently repealed prohibition amendment.

Distribution of medical costs is a grand idea *but* experience doubts its feasibility. Such distribution requires a change in human nature to such a marked degree that no person shall mind paying for another's sickness, real or imaginary!

The cost of medical care distributed over periods of time is no innovation, it is already done. In fact, too large a percentage of the cost of medical care stretches to infinity, as any doctor's files will show! Periods of time fail to help much. The obstetrician's patient, for example, has at least nine months to save up the amount of the ultimate bill. How often is this done?

That the cost of medical care should be met through further taxation, remember that taxpayers of this country are already paying millions of dollars for medical care of people in their public hospitals, a considerable percentage of whom, as has been proved, are quite capable of paying private practitioners.

As to adequate remuneration for physicians no organization outside of medicine is in a position to define the adequacy of recompense. Physicians want only a decent living, but want it by efforts of their own and want to rate their own price and to give their own charity! Surely this is not amiss!

For, after all, who can set a value on a physician's services? There is no standard except what the medical man considers his time is worth, and what his patient can afford to pay. Certainly he seldom charges for his skill.

The matter of remuneration had best be left to the physician, for he is invariably fairer to his patient than to himself. If laymen attempt to set up standards of remuneration, they are liable to rise higher than they are now unless the layman is actually out to be unfair to the doctor. Somehow it seems to the doctor that the laity does have its prejudices!

Naturally, quality of medical care should not be sacrificed to economy of cost. Obviously the public should be educated to accept the neighborhood physician as the skilled person he really is, quite capable of taking care of ninety per cent. of its ills, and capable of advising when a specialist is needed. Economists seem to have the idea that the public in general goes to specialists they can not afford because that public needs such services.

The medical care of the dependent and indigent sick is an obligation of society; up until now, it has been the obligation of the medical profession alone, who give services free of charge receiving no pay nor wanting any for the treatment of the truly indigent.

Doctors need to eliminate the taking advantage of good nature by patients who can pay a fee and by hospitals which accept such persons as charity.

Now the cost of medical care is always a burden to anybody, be he millionaire or wage-earner. As has been aptly said the patient "is paying for something that lacks three dimensions; and the ordinary human mind finds it difficult to conceive why some tangible thing should be sacrificed in order to pay for an intangible like medical care."

One hundred per cent. of the population know that one time or another there will be sickness in the house. But at least 75 per cent. refuse to recognize the fact and make provision for it by laying away a sickness contingency fund.

Distribution of the cost of medical care is an idea as old as the hills. The trouble is no man, rich or moderately able, wants to be altruistic and shoulder the other fellow's burden. The poorer the patient the greater his altruism.

No sympathy should be extended the patient who insists on passing by good medical service that he can afford and insisting on super-service that he does not need.

"When John Jones, in the lower income bracket, buys a car; despite the fact that he would much prefer a Rolls-Royce, let us say, he selects one in the low-priced field."

"On the other hand, let him need an appendectomy, and he will pass over a hundred good surgeons capable of performing a perfect operation for a moderate sum, and go to an outstanding man whose price he knows is very high. From him he will demand a reduction in the regular fee. The same is fully as true in medicine as in surgery." All doctors know this.

The worst ailment in medicine today is that doctors are not allowed to run their own business. Now medicine is quite a way down the wrong road, where it has been led, partly because of its own fault in giving everything away.

Medicine finds itself at present competing with lay agencies—competing not for the right to make a living so much as for the right to practice medicine as years of experience dictate it ought to be practiced.

If reformers were honestly in earnest they would be sufficiently candid to admit that any doctor knows more about medicine and about human nature in relation to medicine than does any combination of Endowed foundations or organizations of lay dictators.

VITAMINS AND DEFICIENCY DISEASES

If the future sustains its short but startling past, the science of vitaminology enters the records of the race as the most vital discovery within the memory of civilized man. Neither the arc-light, nor the telegraph, nor the cable, nor the radio, nor the conquest of the air, can hold the proverbial candle to the effect upon mortal man of the perfection of the synthesis and science of vitamins, unless research, today, has made the most glaring error of its career.

Vitaminology may or may not provide for an eager populace, that fabled Fountain of Youth for which even the earliest Aramaic gods and men went seeking, and in pursuit of which thousands of years later the gay Ponce de Leon lead his Spanish cohorts into the wilds and swamps and loveliness of what is now the American State of Florida. Unless some two decades or more of positive research findings, both laboratory and clinical, are utterly without merit, this new science of vitaminology, in ethical application is at once the sword and buckler of the physician and the rod and staff of an afflicted human race.

Now the root idea of vitaminology is that multitudinous forms of human disease and affliction are manifestations of a systemic weakness or deficiency, either in quantity or quality, or in total absence of some element vital and indispensable to the proper functionings of the human body and the human mind. To prove this, intensified study and experiment advance

the premise that toxic conditions, disturbed endocrinology and general malfunctioning exist, not as a cause, but as an effect. In other words, that the bulk of human disease is *less an attack* than it is *a lack of defensive mechanism.*

In 1927, P. Mazé writing in "La Nutrition Minerale de la cellule vivante et les vitamines," designated vitamins as "the hormones of the vegetable world." In further description Mazé commented,—"vitamins consist of highly unstable mineral organic compounds whose presence in plants is necessary in a constant definite ratio before normal metabolism can proceed."

Subsequent laboratory and clinical findings extend this inherent vitaminic quality to the human race as well as to lesser forms of animal life.

Six years previously in the Bull. Gen. de Therap. of Paris (see vol. 171, page 125 D. Gannassini and P. Mancini had reported "Vitamins regulate trophic changes in synergic connection with the trophic regulating function of the glands of internal secretion." The article, entitled, "Nouvelle interpretation sur le mechanisme d'action des vitamines," is well worth reading in the original. Again in 1927, in "Über die Beziehungen zwischen Hormonen und Vitamen," E. Vogt demonstrated "intimate relationship between hormones and vitamins."

Laboratories and clinics are busy all over the world since then as to vitamin content. Evans and Burr at the University of California discovered the *sex or reproductive Vitamin E.*

Ethel Browning of Liverpool, Eng., assistant pathologist to the Pickett-Thomson Research Laboratory, St. Paul's hospital, London, wrote in 1931:

"The effects of avitaminosis on the sexual glands are also especially related to the deficiency of Vitamin B and Vitamin E."

Since that writing in England Vitamin B has divided into Vitamin B, coefficient one and B, coefficient two.

Again in 1927 Cotte and Carcosonne in "Carence alimentaire avitaminosis et fonctions sexuelles," Lyon med. Vol. 140, page 617, declare "a diet deficient in any of the vitamins, especially in young girls, may cause irreparable damage to the ovary. Vitamins play the part of true hormones constituting stimulants to ovarian activity and preventing the occurrence of both amenorrhea and sterility."

In 1927 Evans and Burr noted resemblances between the properties of "ovarian hormones and vitamins A and E."

In the Journal of the American Medical Association for January 19, 1935, on page 175, Thomas T. Mackie writes most competently:

"During recent years the concept of deficiency disease has been enlarged. It is becoming inficiency produces a variety of vague borderline states of ill-health that have no place in existing nomenclature. . . The contributory factors are more complex than those operative in the laboratory. . . Deficient supply of other essential food substances such as iron, protein, calcium, phosphorous and iodine undoubtedly contribute to the syndrome. . .

"We have encountered indications of deficiency disease in forty-seven cases of chronic ulcerative colitis. These observations have been drawn from seventy-five consecutive cases seen in hospital, dispensary and private practice in New York city. They represent all stages of the disease *from mild localized proctitis to advanced and extensive involvement of the entire colon . . .* the objective changes that have been shown to occur in various deficiency states find expression *particularly in the mucous membranes of the mouth, in the skin, in changes in blood chemistry and in the associated anemia."*

After detailed citation of symptoms and results Dr. Mackie writes:

"We believe, therefore, that deficiency disease is not to be regarded as an occasional complication of ulcerative colitis. *It seems more probable that it is a part of the underlying mechanism. With the appearance of indications of deficiency disease the pathology changes: the symtoms become more complex: the clinical picture more severe and the prognosis more grave."*

Dr. Mackie evaluates here the situation as a lack of not one but several vitamins and suggests these to be Vitamins A, B^1 and B^2 (or G), and possibly D while lack of biologically complete protein and of electrolytes appears to contribute to the complex clinical picture in varying degree."

Quoting Dr. Mackie's "Conclusions" we find him saying:

"1. Evidence of deficiency states has been observed in 62.6% of seventy-five cases of ulcerative colitis.

"2. These indications find expressions in the

buccal and lingual mucosa, the skin, the type of anemia and the blood chemistry.

"3. When present in advanced degree they have invariably been associated with characteristic changes in the small intestine.

"4. Secondary or conditioned deficiencies appear to be important factors in the pathologic physiology of the disease."

Dr. Mackie backs up his contentions from his own able and scientific experience by a score or so of authoritative references.

These findings of Dr. Mackie bear witness to the truth of the role previously allotted to Vitamin A in that its functions "promote tissue formation; appetite and digestion; growth and feeling of well-being; increase blood platelets and *prevent infections, notably of EYES, tonsils, sinuses, lungs and gastro-intestinal tract and air passages,* just as they testify to the merits of Vitamins B-1,2, and 3, (or B & G) as nerve nourishing factors and growth promoting factors and pellagra and beri-beri cures, with the functions of these 'B' vitamins listed as protection from nerve and brain diseases and certain vagaries thereof; promotion of metabolic processes; incentive to lactation and promotion of digestion.

Briefly epitomizing qualities of other of the known vitamins it may be as well to review them here as the anti-scorbutic Vitamin C, with its regulating substances and its prevention of scurvy; vitamin D, the anti-rachitic vitamin with its control of calcium equilibrium and regulation of mineral metabolism; and of Vitamin E, the *sex vitamin* with its determining role in reproduction by failure of placental function, its cure of sterility in the female, its retarding action upon sterility in the male, and the current experimentation with this vitamin as *to its probable factor in the predetermination of sex.* The question of the powers of vitamin E in the metabolism of iron are accepted by some authorities and questioned by others."

Herbert McLean Evans, M. D., of Berkeley, Calif., writing in the Journal A. M. A. for Aug. 6, 1932, of Vitamin E (and he is its accredited discoverer) says in part:

One of the most remarkable results of nutrition researches in the last decade has been the demonstration that laboratory animals successfully reared on simplified dietary mixtures consisting of protein fats, carbohydrates and *the vitamins hitherto known,* that although healthy adulthood is reached sooner or later such animals lack the power of reproduction: *i. e., sterility intervenes."*

Further Dr. Evans in this same article writes: "Other types of sterility almost never give the characteristic picture for male and female as has been described for low E . . . Wheat germ creasingly apparent that chronic vitamin deoil is one of the best sources of Vitamin E."

Again as to deficiency of Vitamin A which the groping, eager Hippocrates is said to have felt in some sixth sense with his prescriptions of "liver and honey" for the same deficiencies for which doctors now prescribe Vitamin A,—note the comments of Lafayette B. Mendel in the Journal A. M. A. for April 23, 1932:

"A characteristic ophthalmia is an almost unfailing manifestation of a diet lacking in Vitamin A; it is promptly cured if some source of this food factor is included in the diet before the bacterial invasion of the diseased ocular tissue leads to irreparable damage. . . . Particular interest has centered latterly in the evidences of respiratory infections consequent on a diet deficient in Vitamin A. . . . Wolbach and Howe concluded that the outstanding change is a substitution of stratified keratinizing epithelium for normal epithelium in various parts of the respiratory tract, alimentary tract, eyes and the paraocular glands, and the genitourinary tract. The histologic change characterized by a transformation of cuboidal into keratinized cells seems to be due directly to the nutritional deficiency; infection then readily attacks the weakened tissues."

And again, "It is quite likely that Vitamin A helps to preserve the physiologic integrity of various epithelial structures and thus to maintain "the first line of defense against invading bacteria."

E. V. McCullum who has done magnificent work in vitamin research—(he is said to have first differentiated Vitamin D) writes of Vitamin B deficiency, "Outstanding among the symptoms of Vitamin B deficiency is anorexia." Since its initial discovery by E. Mellanby of Great Britain in 1917-18, Vitamin D has been the rachitic panacea.

Two new vitamins are said to be on the verge of revelation.

What vitamins we have at hand have already opened a new path to longevity and health, and palliation of human misery. But so great a hold has report of these discoveries taken upon the public imagination, and so habituated is the American people to the vice of self-medication and patronage of patented nostrums, that it cannot be repeated too frequently wherever medical men are gathered together, or wherever a medical ear may be sought to listen that it is absolutely necessary, aye, imperative, that the profession shall take its stand flatfootedly as *to the exactions of scientific diagnosis for the administration of vitamin therapy.*

When electrotherapy came first into the picture, far too many of the profession were not only hesitant to give this "magic," as the people thought it, even an ostensible hearing but were over condemnatory of its possibilities. As a consequence we have all sorts and varieties of "rays" and "lights" and "whatnots" sold at every chain store in the country with self-cure circulars and God knows what results to the people who use them.

Charlatans, quacks, and "big business" are swift to seize upon the skirts of science. In the near future the markets undoubtedly will be flooded with all sorts of "new vitamins" to make old men young, blondes out of brunettes, and eight cylinder cars out of decrepit "Tin Lizzies." It has been stated in these columns before and is repeated here with emphasis that it is the urgent duty of the medical profession to present a solid front against the encroachments of cultists and quacks upon this great and recently discovered branch of therapeutics. Probably nobody will be poisoned by any vitaminic nostrums. It will be always simply another case of a poor fool sending "check or money or order; one bottle, one dollar; six bottles five dollars" for a couple of quarts of sugar, water and vegetable coloring.

On the other hand the profession should avail itself of ethical, balanced and dependable pharmaceutical products of vitamin content, veritably as much of an aid to medical practice as are the accepted biologicals and serums now everywhere in ampoule distribution.

PERTINENT VITAMIN E BIBLIOGRAPHY

Because of their length and the limited space in the magazine neither the "Conclusions" nor the "Bibliography" followed the article "Physiological Effects of Vitamin Deficiencies as Summarized Briefly from Recent and Authenticated Research Experiments," published in the Journal for December, 1934.

In response to scores of requests herewith is printed a partial bibliography. Especial attention is called to these items:

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Note also the appended excerpt from "Annual Review of Biochemistry, 1: 1932, with its attached bibliography.

VITAMIN E

"Interesting information has been gained as to a relation between vitamin E and certain autoxidants or "anti-vitamins," as a result of work by Mattill and collaborators on the one hand, and Waddell, Steenbock, and others, on the other. Milk to which traces of iron and copper are

added is thereby rendered satisfactory so far as the prevention of anemia is concerned (Waddell, Steenbock, Hart, and VanDonk); but it is found that, though not lacking vitamin E, it gives rise to total sterility in males, with disappearance of germinal epithelium and loss of testicular tissue (Waddell and VanDonk). The addition of the iron to the milk appears to antagonize the vitamin E; and an anti-vitamin can be extracted with ether from the iron-treated ration (Waddell and Steenbock). Cummings and Mattill show that the efficacy of a given source of vitamin E depends on the presence or absence of certain associated fats which function either as autoxidants or anti-oxidants. Thus fats like cotton-seed oil or butter, which take up oxygen relatively promptly, are satisfactory in preventing sterility, while others such as cod-liver oil or lard which take up oxygen after a longer period are unsatisfactory. The anti-oxidant in lettuce has been separated from the vitamin (Olcovitch and Mattill); and independent work has demonstrated the great vitamin E activity of this vegetable (Mendel and Vickery).

"Injection of vitamin E in infantile rats induced hypertrophy of the uterus, resembling the action of pituitary hormone (Verzar), or incited oestrus (Szarka). Spontaneously occurring sterility in cows has been cured by vitamin E (Vogt-Moller and Bay), and its therapeutic application to habitual abortion in man is urged (Vogt-Moller). Juhasz-Schaffer has carried out some detailed work on the vitamin and confirmed many earlier results; the histology was examined fully, and the vitamin shown to be stored in the body, and present in small amounts in the feces. Wheat germ oil added to embryonic chicken tissue stimulated its growth in vitro. Sure has published a full recapitulation of work on vitamin E with eighty references.

MISCELLANEOUS STUDIES ON VITAMIN DISTRIBUTION

"During the year have appeared Parts I and II of Volume VIII of Scheunert's treatise on the "Vitamin Value of German Foodstuffs," published by the German Ministry of Nutrition and Agriculture, and dealing respectively with fruits and vegetables, and flours and breads (Scheunert [2]). With Schieblich he has written a comprehensive monograph on the vitamins in milk, for the "Handbuch der Milchwirtschaft," giving close on two hundred references (Scheunert and Schieblich). Other of his papers deal respectively with the vitamin values of: vegetables; conserves; egg-yolk extracts; staple foods; and mushrooms (Scheunert [1, 3, 4, 5]; Scheunert and Reschke). Other writers have examined yeast for B1 and B2 (Quinn, Whalen, and Hartley) and malted milks for A, b1, and B2 (Quinn and Brabec).

CONCLUSIONS

"Perhaps the principal impression one gains in retrospect is the immense volume of work published. To keep pace with this has entailed several hours daily reading throughout the year, of a widely scattered literature. On vitamin D alone some 300 communications have appeared. The great majority of papers represent some definite addition to knowledge; and while, undeniably, communications vary considerably as to their fundamental significance, in no branch of science does ultimate progress seem more dependent on the cumulative effect of continual small advances. Striking progress has been made over a wide area, ranging from clinical medicine to chemical physics. It has seemed best therefore to attempt a comprehensive epitome of the year's work rather than choose certain aspects at random and ignore others of possibly equal value and interest. Among the more important developments we may note the following: The establishment of international standards and units of vitamin activity. Appreciation of the significance of lactic acid excess in avitaminosis B1. Numerous papers on new B vitamins, but results not easily comparable for lack of uniformity in definitions. Role of carotene as pro-vitamin A substantiated. Question as to which absorption bands are characteristic of vitamin A. Physiology of night blindness; and vitamin A deficiency as cause of experimental periodontal disease and nerve degeneration. Preparation of crystalline vitamin D. Hypervitaminosis D and mode of action of vitamin D. Clinical value of vitamin D in arresting dental caries. Influence on vitamin E of associated autoxidants, iron, etc. Within the space of a week or two since the beginning of the new year have come reports of the isolation or identification of vitamins A, B1 and C, by Karrer or Drummond, Windaus and Rygh re-

spectively; discussion of these must be deferred until next year.

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WE HAVE BUILT UP IN THE UNITED STATES A MOST DANGEROUS FORM OF TYRANNY, A MEDDLING PATERNALISM THAT KNOWS NO MASTER

For two decades we have fought persistently and consistently against an overcentralized government in Washington, against the lay dictation of practice of medicine, and against the encroachment of the United States Government into the practice of medicine in fields other than prevention of disease. If democracy (as well as industry and medicine) is to survive, these evils must be stopped. Already we have built up in the United States a most dangerous form of tyranny, a meddling paternalism that knows no master. Of the scores of paternalistic bills threatening Washington it is meet to note that Senator Borah has said:

"The course we are now pursuing will prove in the long run more dangerous to our government than a foreign foe." Senator Borah further said: "A proud strong Nation may suffer a reverse in arms but time may still find it triumphant. An independent and self-reliant people may be overcome by the fortunes of war, but time fights on their side to final victory. But a nation whose citizenship has been drugged and debaunched by subsidies and gratuities and bonuses, who have surrendered to the excesses of a treasury orgy, has taken the road over which no nation has ever yet been able to effect a successful retreat."

With Senator William H. King of Utah (congressional record Feb. 10, 1921), we agree "that the struggle is now on between the consolidated and powerful Federal Government, dominated by bureaucratic forces, and the rights of the people as individuals, as the sources of power and authority, and the rights of local communities and of the states themselves. And the voices that should be strong for local self government, for personal liberty, for freedom, and for those principles and policies that make a strong and democratic people, seem to be silent, and the strident cries of the centralized forces in the land either freightened the people into submissiveness, or win them to the acceptance of dangerous and destructive policies.

What we need now is a leader who will arouse the people to the necessity of putting hooks in the jaws of the federal government and of reviving the spirit of personal independence and local self government which inspired our fathers in the days of the revolution. . . . I wish a crusade would be inaugurated in all parts of the land against the accursed spirit of bureaucracy and paternalism. . . . Congress is becoming so impotent that many believe . . . we sit in this chamber merely to O. K. bills prepared by government officials. It has been charged that we lack courage to support the charge."

Politics, led by loud voiced self styled friends of the people is making steady inroads into every activity, and there is going to be only one outcome. The whole practical progress of the country is going to slow down. A certain type of politician gets office and power by demanding laws or government action for every ache any one of us has. But American progress and prosperity have been maintained not by government or politicians but often in spite of them. They are the product of the free energy, initiative, and intelligence of private enterprises, and we barter our brithright for a mess of pottage if we turn from that wise policy to government aid, bureaucracy and political officialdom. We have no excuse for making such a blunder, for the latter system has been demonstrated in the old world and is one of its chief burdens today.

Repeating what we have preached in this Journal and elsewhere for twenty years, we still believe in the essential virtues—self reliance, thrift, subordination of expediency to righteousness.

We have no sympathy with paternalism or undue dependence on the *Grandmotherly* state,

either in medical or commercial affairs. We resent Governmental meddling in private affairs. We are a staunch supporter not only of state rights but of local autonomy, of local initiative, of neighborly co-operation. We admire the original plan of town government, a government of the citizens and by the citizens.

Personal freedom is in danger, and personal freedom is an essential condition for progress in society. Government ownership of anything tends to shackle freedom. The balls and chains on the hands and feet of a convict in prison are quite bearable in comparison with the shackles which government practice of medicine would forge upon members of society.

Bureaucratic administration and government practice of medicine will mean compulsory shifting of duties proper to the individual to a subsidized government agency and this in the end will destroy the initiative, self-reliance and independence, without which democracy generates into autocracy.

1935 ANNUAL MEETING

Arrangements are now well under way for the 85th Annual Meeting of the Illinois State Medical Society to be held in Rockford on May 21, 22, 23, 1935. The meetings will all be held in the large Faust Hotel, so that it will be unnecessary to go out of the building for any session.

The Winnebago County Society has a well organized Committee on Arrangements, with Dr. T. H. Culhane as General Chairman. Everything is being done to make this a real meeting which will appeal to every member of the State Society. Hotel accommodations are not only reasonable, but there is ample room for everyone desiring to attend the meeting.

The Secretaries' Conference will be held at 9:00 A. M. Tuesday, May 21, and the officers of the Conference will arrange a program which will not only appeal to society officers, but to the membership at large.

The Pediatricians will hold their annual meeting on Tuesday morning, and their officers are arranging a well balanced program which will be of interest to all physicians who have anything to do with the care of infants and children.

The section officers of the five scientific sections will have programs carefully arranged, and the subjects to be discussed will be of interest to all. The newly created Committee on Scientific Exhibits, with Dr. J. S. Templeton as chairman and N. S. Davis as secretary, will carefully select a large number of interesting scientific exhibits, and will give suitable awards for the best exhibits in each of the three general classes. Further information concerning these exhibits appears in this issue of the ILLINOIS MEDICAL JOURNAL.

The House of Delegates will hold its first meeting at 3:00 P. M. Tuesday, and the second meeting will be held at 8:00 Thursday morning.

The President's Dinner will be held on Wednesday evening, and the local committees are arranging everything to insure the success of this highly important function.

The sale of spaces for commercial exhibits opened on January 10, and the sales to date have been highly gratifying, and there is no question that the Society will have the best line of commercial exhibits that have been shown at any meeting in recent years. These exhibits are selected carefully, and only reliable concerns are permitted to display their products in the exhibit.

The local committees, scientific section officers, and general officers of the Society are working together to make the 1935 Annual Meeting one that will be long remembered, and it is hoped that all members of the State Society will begin now to make their plans to be present when the meeting opens in Rockford on May 21.

SCIENTIFIC EXHIBITS

The Council, feeling that the scientific exhibits at the annual meetings of the Illinois State Medical Society should be featured more than they have been in the past, has appointed a special committee to have charge of the exhibits at the Rockford meeting. It has also authorized an award of $25.00 for the best exhibit in each of three classes:

1. Exhibits by individuals.
2. Exhibits by non-teaching institutions, hospitals or clinics.
3. Exhibits by medical schools, teaching hospitals or clinics.

Certificates of honorable mention will be given to other exhibits of merit in each of these classes and an award to the best exhibit in all classes.

Those desiring space in the Scientific Exhibit

request application blanks from N. S. Davis, III, 700 North Michigan Avenue, Chicago.

Committee on Scientific Exhibits: J. S. Templeton, Chairman; Cleaves Bennett (deceased); J. P. Simonds; R. S. Berghoff; N. S. Davis, III, Secretary.

AN EXPERIENCE DURING SIX YEARS OF HEALTH INSURANCE IN AUSTRIA

The medical society of the state of New York under date of February 1, 1935, released the following:

ALBANY, N. Y., Jan. 31. Stigmatizing the health insurance bill pending before the state legislature as a measure under which patients would get poor medical care, and physicians would degenerate into callous machines, Dr. Jacob L. Moreno of New York City, appeared here today (Thursday afternoon) to enter his protest against the law. He told members of the Legislative Committee, Medical Society of the State of New York, his experience during the six years under health insurance in Austria.

"All such schemes," he said, "operate to make physicians into mass-production machines turning out standardized treatment to patients. Every patient is an individual medical problem. Health insurance cheats both the patient and the doctor. In the name of trying to advance human welfare, such measures actually retard progress."

Dr. Moreno is director of research, New York State Training School for Girls, Hudson, New York, and adviser of the Subsistence Homestead Division, Department of the Interior, Washington, D. C.

"I know from experience with the actual reality," said Dr. Moreno, "that no matter how rosy the picture of ideal care for the poor that is presented by such schemes for health insurance, in practice they do not work. They cannot work, because they fail to take account of factors in human relations which are indispensable to the practice of the healing art.

"No physician," added Dr. Moreno, "is capable of properly treating the large number of patients sent him under health insurance. So he is forced to evolve some mass-production plan of operating his office to run people through his mill as fast as possible. A quick look, a stock prescription, a pat on the back, and out the door.

"The 'rush' system of handling patients is inevitable. When the technique of getting them in and out fast enough is perfected, the doctor begins to lose that intangible 'something' which is vital to both himself and his patient—his morale. I do not know any doctor who remained long at this sort of practice in Austria who did not become hardened. A doctor's personal interest in his patient is essential. The response he makes emotionally to the trust reposed in him is important. If the patient comes to the doctor because of confidence in him and not merely because he is an insurance doctor, interest and insight are quickened. Mutual free choice is basic to good medical care.

"Every person's capacity to expand emotionally, and to sustain a confidential relationship, is limited. A physician may be able to maintain a keen mental activity while examining a few cases a day, but after his limit is reached, the power to sustain the faculties on a high plane wanes, until, finally, when the last case of a long line is reached, the patient becomes merely a serial number on a piece of paper. Health insurance forces on the doctor an utterly impossible human task—to sustain a genuine personal interest in all the individuals of a miscellaneous crowd at his door.

"The insurance doctor does the best he can, but patients suspect they would get better attention if they came to him during his private office hours when he could give them more time. This is a distinct and definite injury to the character of the physician. He must hurry through his insurance patients so that he can have plenty of his best self left to take care of his private patients. This is a corrupting influence. He knows he has not lived up to the highest tenets of his profession to give his best to every patient who comes to him. He has been forced by circumstances enacted by a law to do less than his best by some of his patients, and even his best with the few who see him privately gradually becomes not so good as it was once.

"Nobody who has not seen such schemes in practice as I have, can realize how odious they are. They destroy everything that makes the healing art effective. A new face comes between the doctor and the patient, that of an inspector

or supervising physician, or an insurance bureau bookkeeper, questioning this and that particular, without the intimate understanding derived from having seen and known the patient. At best, the real patient, the one for whom the mass production doctor is working, whom he must please if he is to live, is not the sick man, but an adding machine in the office of a bureaucrat who pays the fees out of an insurance fund. This man doesn't care whether the patient lives or dies, only how much he costs the fund. And his influence is exerted only in the direction of economy and other externals.

"Supervisors are needed in health insurance organizations. A good controller or supervisor who brings in many complaints against doctors is a good supervisor—he is headed for promotion because medical practice has now become a business instead of a profession. Thus do we destroy a truly healing relationship of which trust and confidence is the basis, and substitute a chain-store, cut-rate imitation, which corrodes curative values needed to heal the sick.

"The system which we now have in the United States is not perfect. But I know from personal experience that the conditions imposed by health insurance are far worse. Health insurance is a type of socialized medicine. It is impossible to socialize the doctor unless the business man, the banker, and the lawyer are socialized, too. Until the time comes, if it ever does come, when we have communism or some form of collectivism, health insurance simply will not work. Though it applies only to the lower income groups, those groups will always feel they are getting less than they ought to get, even if the doctors are men of quality having lucrative private practices in addition to their insurance practice. Like all half-way measures, it will fail, despite the well-meaning altruism of those who sponsor such legislation. They do not realize, as the physician does, who has practiced under such a system, how destructive it is to quality in medical care.

"Letters which have come to me recently from former patients in Austria state that conditions are no better now than when I left five years ago, but are worse, if anything."

The Legislative Committee is in session here in its semi-annual meeting, with its chairman, Dr. Harry Aranow of New York City, presiding.

STUDY OF ONE HUNDRED CASES OF JAUNDICE, WITH PARTICULAR REFERENCE TO GALACTOSE TOLERANCE

During the last three years Leon Schiff and Fanny A. Senior, Cincinnati (Journal A. M. A., Dec. 22, 1934), studied a group of 100 patients giving particular attention to clinical manifestations, galactose tolerance and ability to excrete bromsulphalein. They determined the degree of jaundice during the course of illness by means of the icteric index and van den Bergh determinations and the presence or absence of complete obstruction by study of duodenal contents, urine and stools. They feel that laboratory studies, particularly the galactose tolerance test, may prove of great help in the diagnosis of some cases and lend confirmatory evidence in others. The technic of the galactose tolerance test that they employed was essentially that given by Shay and Schloss. The galactose tolerance test was positive (output of galactose exceeded 3 Gm.) in forty-nine of fifty cases of catarrhal jaundice and fourteen of fifteen cases of acute toxic hepatitis. A negative test (output of less than 3 Gm.) was obtained in all of twenty cases of obstructive jaundice. Negative tests were mostly obtained in cases of cirrhosis and neoplasm of the liver. The test appears of great value in differentiating acute (toxic or infectious) jaundice from obstructive (extrahepatic) jaundice. The galactose tolerance bears no direct relationship to the degree or duration of jaundice or to the amount of retention of bromsulphalein. In the later stages of acute intrahepatic damage it may remain positive when other tests of liver function have become negative. The test should be repeated when a discrepancy arises between clinical and laboratory observations.

LESIONS OF THE OPTIC NERVE AND RETINA IN PREGNANCY

Henry P. Wagener, Rochester, Minn. (Journal A. M. A., Dec. 22, 1934), points out that the lesions of the retina and optic nerve which occur in pernicious vomiting of pregnancy indicate a severe grade of general toxemia that may prove fatal even if pregnancy is terminated promptly. Earlier and more frequent ophthalmoscopic examinations in cases of pernicious vomiting may serve to give timely warning that the pregnancy should be interrupted. The development of any type of retinitis in a case of hypertensive toxemia of pregnancy is an urgent indication for the termination of pregnancy, not only because of the danger to vision, but also because of the implied certainty of permanent injury to the general vascular system. In cases in which hypertension develops or increases while the patient is under observation, careful watch should be kept for angiospastic lesions of the retinal arterioles, either primary or superimposed on previous organic changes. If the integrity of the systemic arterioles is to be preserved, pregnancy should be terminated, if possible while the arteriolar lesions are still in the angiospastic phase, and certainly at the first indication of the onset of retinitis.

MEDICAL ECONOMICS

Developments in the line of proposed changes in the social order are so many and so rapid that it is difficult for one to keep abreast of the times. Undoubtedly the recent message of the President on Social Security is the outstanding item of importance of the last month. A rather careful reading of the same convinces the reader that definite changes are near at hand especially in regard to Unemployment Insurance and Old Age Pension. The exact nature of these changes will of course depend on the opposition which develops in Congress and makes revision necessary. It appears that the President has followed the recommendations of the Committee on Economic Security to a great extent.

While we as citizens are interested in these subjects, as physicians we do not care to discuss them. It is in the matter of health insurance to which he refers later in his message as follows: "I recommend the following types of legislation looking to economic security. 4. Additional federal aid to state and local public health agencies and strengthening federal public health service. I am not at this time recommending the adoption of so-called health insurance, although groups representing the medical profession are cooperating with the federal government in the further study of the subject and definite progress is being made." In the report of the Committee on Economic Security they state "We have enlisted the cooperation of advisory groups representing the medical and dental professions and hospital management in the development of a plan for health insurance which will be beneficial alike to the public and the professions concerned. We have asked the groups to complete their work by March 1, 1935, and expect to make a further report on this subject at that time or shortly thereafter."

These two statements should remove any doubt in the minds of medical men that great changes in the manner of practicing medicine are threatening at this time. It is fortunate that we have an additional six weeks to use our influence in this matter. But these six weeks should be used to the best advantage. We take for granted that the A. M. A. is using all its influence in this work. State Societies should and are presenting the subject to their Congressmen and the laity in an effort to show them that such a change is not for the good of the patient. A study of the system of State Medicine in any of the European Countries will convince anybody that the grade of medical service is not improved by this method. Morbidity and mortality statistics of these countries suffer in comparison with those of the United States. Also the people are not satisfied with the system or the type of service rendered, but having no choice in the matter must continue to participate. Naturally subterfuges and tricks are referred to by the patients to receive increased attention and compensation. Refusal of the physician to cooperate with them in such plans lead to unpopularity and criticism, with diminishing income. All of this has a most depressing influence on the medical profession.

As individuals, it is our duty to study the question in all its phases so that we can talk with those of the laity who are interested in this subject and be able to answer their questions, as well as prove to them that such a system is not suitable for this country and will not result in better care for the poor and middle class. Many of the laity are interested and there is fertile fields in every community for work by all of us at Women's Clubs, Parent-Teachers' Associations, Rotary Clubs, Lions Clubs and Kiwanis Clubs. Of course, we can make it our business to convince our local member of Congress that such a plan is not desired or feasible in this country.

Recently a questionnaire was sent to the Mayors of about 500 cities and towns in Illinois to obtain their opinion and suggestions in regard to the medical care in their communities and what could be done to improve the same. Too few replies have been received to make any definite report but almost without exception they state that there is no criticism of the way the medical profession is and has been carrying on the past five years and most of the suggestions as to improvements have to do with the work of the supervisors of the Illinois Emergency Relief. We hope to have some very interesting data to submit in the near future. One thing is certain. The public is health conscious at this time and are eager for information on the subject and that is the propitious time for action.

The question of Group Hospitaliation has been before the Illinois State Medical Society

for the past year. During the last six months a special committee of the Committee on Medical Economics has made an intensive study of this subject. They reported at the last meeting of the Council in Rockford. This report is included in this column. You will note that while they are unwilling to make a definite recommendation at this time, they laid down several fundamental conditions under which the plan could be tried. They will continue their study of this subject and more than willing to cooperate with any group of physicians who are considering the experiment in their city. It will be interesting to see how great the demand is for this service and how satisfactory it will be to both the recipients and the medical profession.

The lay press continues to present the question of medical service most of them in a critical manner with either a veiled or frank statement that State Medicine is the solution. Possibly these are spontaneous, but from the names of the writers and their prior records, it appears that they form part of a general plan of propaganda for so-called health insurance. It appears that none of such articles should remain unanswered. *American Mercury* is one of the few lay magazines, that has contained articles presenting the other side of the question. While we as individuals cannot hope to combat such articles, we can be so conversant with the subject that we are able to refute their statements to those who having read them wish to discuss the same with some member of the medical profession. Again, this Committee wishes to insist that every member of the Illinois State Medical Society obtain the pamphlets on this subject by the A. M. A. Read them and every other available article on the subject. It is to be hoped that in the near future, meeting will be held in each Councilor District of the state, at which outstanding men of the profession will address the meeting. When such a meeting is held, make every effort to attend and have questions ready to ask the speakers. As stated before there is work for each member of the society and the time has arrived to do this work.

E. S. HAMILTON, *Chairman,*
Committee on Medical Economics.

CURRENT LITERATURE

The review of current literature relative to the problem in Medical Economic leaves one in doubt as to the actual facts relative to adequate medical care and, therefore, makes final judgment rather impossible at this time.

If as is stated in some of the current literature there are a large number of people in the United States who are not receiving adequate medical care and the statement made in other quarters that there is an over supply of medical men, then it seems perfectly evident that there is a problem that calls for some solution.

In an economic crisis, such as we have at the present time, there seems to be in nearly every field, a so-called over supply in the market. This is a situation primarily resulting not from over production at the present time, but from the lack of purchasing power by the great mass of American people. It would seem quite evident that if a situation of this type exists in the general economic problem of industry that the same thing might be true in the economic field of medicine.

It is quite evident from a survey that there is adequate medical care available for the American people in every community. This may be through the private practice of medicine, through various charitable organizations long established, and though Federal controlled hospitals, etc.

The problem then is not one of available medical care but one of purchasing power of the people who are in need of medical care. These problems exist at all times both in general economic problems and in that of medical economics. They both reach their high tide in severe economic depressions, and recede during periods of economic prosperity so that the study of the problem is not one confined only to the present situation, but should also cover those periods of economic prosperity. It seems quite impossible that we could have a tremendous decrease in purchasing power of the public in all other lines, and not have a marked decrease in their ability to purchase adequate medical care, and this is clearly evident by the fact that the increasing number of people on relief made it necessary for the Federal Government to approve a plan for the payment of medical service.

It would also seem apparent that the Medical Profession through its various channels are better prepared to render medical service to the American people than any other department in our social and economic structure because it was

the last to have to make demands from the federal fund for such care, and it is quite apparent from present obtainable information that the American people have had adequate medical care even during this depression. If it is true that during the periods of economic prosperity there were also a large number of people who could not have adequate medical care, as we appreciate that in its full extent then we have an entirely different problem than we have in this period of emergency. That problem it would seem without any question is largely one of inadequate pay even in the times of prosperity, and the attack of such a problem is not one than can be settled by the medical profession itself, but one that must be settled through the pay envelope of industry.

Most of the programs devised by the Federal Government during this period of emergency, inadequate and untried as they may be, have been forced upon the Federal Government by the collapse of industry and the economic order, creating an emergency situation to which not only millions of unemployed but industry itself looked to the Federal Government for relief. This situation is not common to the present economic crash but has existed in every economic depression before. It seems quite probable then that if we are not able to organize medicine and industry to balance the purchasing power of the public for adequate medical care, providing such conditions actually exist, then in that event some type of untried and experimental plan may be evolved through federal channels for the solution of this problem.

It would seem therefore that industry as a whole should be vitally interested in the solution of this problem, because if it can not be solved by the profession and industry, it will eventually lead to governmental attempted solution, and is bound to be the beginning of other types of social legislation to correct apparent evils in the lack of purchasing power of all of the other necessities of life. It can not be isolated from the whole economic picture because it is as much a part of the whole picture as are articles of food, clothing, shelter, education, etc.

R. F. Packard, Chairman of the Council.

The Shortcomings of Health Insurance

During the past few months we have heard many murmurs from various sources that our government would insist on a program of health insurance, or some form of socialization of medicine, at the next session of Congress. President Roosevelt appointed a Committee on Economic Security to make an intensive study of various subjects with the idea in view of stabilizing the future security of our citizens. It was stated when this committee was formed that their recommendations should be made to the President during December and that some of their recommendations may be used in the President's message to Congress.

This committee under the chairmanship of Miss Perkins, Secretary of the Department of Labor, selected some fifteen subjects which they considered of sufficient importance along the lines of future security as a basis for their study. Provisions for meeting the economic risks of illness was among the subjects selected, and was made a major study after they were besieged with letters, telegrams and personal calls from many proponents of health insurance. A director of study was selected, and a medical advisory committee consisting of eleven or twelve prominent men in medicine and its specialties, was appointed to discuss the subject of medical care in its relation to economic security.

This advisory committee held a conference in Washington recently which lasted three days. At the end of this conference it was generally agreed that further study of the question was advisable before any recommendation should be made. It is stated that although other conferences were in session at the same time, there were more visitors in the gallery listening in on the medical discussions, than could be found elsewhere among the conferences. President Roosevelt addressed those assembled at the conferences and although announcing that he was favorable to unemployment insurance, he did not recommend any form of health insurance, but his references to this subject were as follows:

"Whether we come to this form of insurance sooner or later on I am confident that we can devise a system which will enhance and not hinder the remarkable progress which has been made and is being made in the practice of the professions of medicine and surgery in the United States. At this time we are deciding on long-time objectives. We are developing a plan of administration into which can be fitted the various parts of the security program when it

is time to do so. We cannot work miracles or solve all our problems at once."

Under all systems of health insurance to be found anywhere, and we now have some twenty-seven civilized countries where one of these is in use, there is a definite mechanization of the practice of medicine. Physicians must do much clerical work, make out reports in duplicate, or triplicate, all of which consumes a large amount of his time. It is quite obvious that such work is detrimental to his professional well being, and he loses much of his incentives for development, study, and his usual observations along the line of medical progress.

Health insurance is not cheaper than our present plan of providing medical service. Although the statement has been made repeatedly that as high as 62% of the American people today are receiving no medical care, those of us who are engaged in caring for the ailments of the sick know that it is not true. It is extremely difficult to find in any community, indigents who are receiving no medical care, if they want it. Some people are still opposed to all forms of medical care, and although it is offered them, they actually refuse it.

The people who are talking the loudest for health insurance in this country are principally those who expect to profit under such a system should it be established. The people who would receive free medical care under it, those who would pay for it, the indigents who are unable under any conditions to buy medical care, are not asking for health insurance. Leaders in industry, business, labor, and the various professions are not asking for health insurance in any form.

Health conditions as shown by reliable statistics, are better in this country than they are in European countries which have had socialized medicine over a period of years. In those diseases which have generally been reduced both as to their mortality and morbidity in general, they have been conquered to as great an extent in the United States without it, as they have under health insurance elsewhere. It is therefore quite obvious that there is no health advantage gained through the establishment of any system of health insurance.

Taxation is a necessary component of health insurance, and the project does not lend itself like other forms of insurance, to actuarial accuracy. Statistics from European countries where health insurance is now applied either in full or in part, show conclusively that the cost for providing medical care to those who are the beneficiaries under it, is greater than the cost of providing adequate medical care by the former method where the patient alone is responsible for the bill.

The history of "Health Insurance" has proved that "sickness" is an indefinable condition which is often coveted by the insured person with no desire to get well. Under it, the period of convalescence is considerably increased, and there is a general tendency of insured workers to malinger, and actually be "sickness conscious", rather than health conscious.

Summarizing briefly the facts concerning health insurance, we can say:

1. The cost of medical care is not reduced.
2. The incidence of illness is materially increased.
3. The type of medical care given under it, is definitely inferior to that received when the physician-patient relationship is maintained.
4. Medical progress is deterred under health insurance.
5. Any satisfactory system of health insurance must necessarily mean increased taxation for all.
6. Judging from the experiences in those countries operating some system of health insurance, there is a general deterioration of both the practice of medicine, and the institution of medicine—affecting not only the physicians who spend their time caring for the sick and the injured, but also those whose lives are dedicated to research, and other developmental branches of the institution of medicine.
7. The type of medical care administered under health insurance is actually inferior to that given in private practice.
8. If unhampered by politics, the medical profession of this country can within a few years develop its own system of providing adequate medical care to all, with charges in proportion to each individual's ability to pay for same.

H. M. Camp, *Secretary,*
Illinois State Medical Society.

Report of Committee

Report of the sub-committee on the Study of Group Hospitalization to the Committee on

Medical Economics. Later accepted by the Council and ordered published in the ILLINOIS MEDICAL JOURNAL.

Considerable information on this subject has been garnered from various sections of the country, where group hospitalization is in practice, all of laudatory character. It would appear to this sub-committee that there are many points in favor of such a plan. However, we feel that there is some reason for hesitancy in recommending such a move right now. There are certain pitfalls in the form of schemes for socialization of medicine. Unqualified endorsement of group hospitalization might lend encouragement to an allied plan for group medical care at this moment of economic frenzy.

We suggest, however, that any community of members of our Society, wishing to inaugurate a group hospitalization plan receive hearty cooperation from this council, and whatever assistance we may be able to give, provided the specifications include the following tenets:

1. The plan must be acceptable to the local county society.
2. The majority of the Board of Control must be in the hands of the local county society.
3. The organization must not be for profit.
4. The plan must in no way involve medical service.
5. There must be no interference of the relationship between the patient and the physician of his choice.
6. The plan should be open to all hospitals in the community.

Respectfully submitted,

SUB-COMMITTEE ON THE STUDY OF GROUP HOSPITALIZATION,

C. E. WILKINSON, *Chairman.*

METAPHEN IN GASTRIC ULCER

No other medicine should be used when giving Metaphen 1:500 by mouth in gastric ulcer and colitis, as it is incompatible with iodine and its salts, strong alkalies, acids and salts of all heavy metals.—C. M. Trippe, M. D., Asbury Park, N. J.

ALGER HEROES ARE EXTINCT

Gruff father to son—"Why don't you get out and find a job? When I was your age I was working for $3 a week in a store, and at the end of five years I owned the store."

Son—"You can't do that nowadays. They have cash registers."—*Boston Globe.*

Correspondence

ILLINOIS SENDS HEALTH INSURANCE PROTEST TO PRESIDENT ROOSEVELT

January 12, 1935.

To His Excellency,
the President of the United States,
the Honorable Members of Congress, and
the Committee on Economic Security.

Preamble. The Illinois State Medical Society, through its Council, wishes to call to your attention certain phases of the proposed Health Insurance program, which may briefly but authoritatively explain why this body of 7,500 men is opposed to the experiment.

Proponents. Who are advocating Health Insurance? Who are urging its establishment? Not the indigent, for they cannot pay for it. Not the employed, for they prefer to choose for themselves how their money shall be spent and to whom paid. Labor Unions have not asked for it, neither the so-called "white collar class" nor the members of organized medicine, who are essential to its success.

The agitation for official health insurance has come from other sources. Since neither the persons who are supposed to benefit therefrom nor the medical men who must provide the service have been interested in promoting the project, there is serious reason to believe that the scheme would be detrimental to both.

Wherever Health Insurance has been introduced, little or no consideration has been given to the workers who were to become the patients or the physicians who were to supply the service.

The whole campaign has been interesting as well as depressing from a political standpoint, since it is questionable whether even the unselfish benevolence of mankind has done more good than harm by hasty interference with the natural evolution of social forces.

The Need. There is no evidence that a Health Insurance scheme is needed by or would benefit the people of the United States. Health conditions generally are far better in America than in any other first class nation, not excepting those where Health Insurance schemes have been fifty years in force.

Statistics published by the League of Nations show clearly that the United States had a lower general death rate and a lower infant death rate

in 1933, as well as a lower mortality and morbidity rate from diphtheria and tuberculosis than any other first class power for which data are available, as the following table discloses:

MORTALITY AND MORBIDITY, 1933

	All Deaths Per 1,000 Pop.	Infant Deaths Per 1,000 Births	Diphtheria Per 100,000 Pop. Deaths	Diphtheria Per 100,000 Pop. Cases
United States	10.7	59	3.9	39
Germany	11.2	76	5.6	114
England and Wales..	12.3	63	6.3	117
Scotland	...	81	7.2	180
France	15.8	75	...	50
Irish Free State.....	13.6	65	12.9*	113
Poland	14.2	128	17.0*	52
Illinois	10.5	49	1.7	22

*1932.

Health improvement, moreover, has been more rapid in the United States than in any other nation except some with small homogeneous populations, and not a few of our states have health records which are unsurpassed. Such an improvement is convincing evidence that the system of medical practice and public health service prevailing in America is superior to any to be found elsewhere.

Private Organizations. Such ventures cannot be administered by independent companies because—the indigent class have no money for Health Insurance and the low income class can be cared for only imperfectly by this system, as crucial experiments in other nations have shown. No system of sickness insurance is or can be supported entirely by the contributions of the beneficiaries nor yet with the help of employers. If not compulsory, the young and healthy will not join and the old and feeble, if accepted, will raise the cost to a prohibitive degree, and if rejected will remove the protective feature and exclude those in most need.

Taxation is a necessary component, and the project does not lend itself like other forms of insurance to actuarial accuracy.

Federal Subvention. Federal control is alone possible, and this aspect of the plan presents many difficulties. The expense is enormous—in Germany $300,000,000 and in Great Britain $160,000,000 per year is spent for inferior work and on relatively small populations. In Germany 35,000,000 insured pay four times as much for medical care as 30,000,000 not insured. If all workers in the United States were insured, the cost would be from two to three billions of dollars per year. If the unemployed and other classes are included, as they must be to give the scheme any value and completeness, the expense may easily rise to as much as four billions of dollars. Fifty per cent. of the income is usually accepted as the amount to be supplied by the government for its share of this expense in management, and if the indigent are added, the whole burden should be on Federal shoulders.

The difficulties arising from the administration of Emergency Relief in the United States will be multiplied many times over in the attempt to develop, rule and guide a uniform insurance plan among the native, the naturalized and widely diverse state populations, some of which have as high as fifty per cent. colored voters without taxable property (Mississippi and South Carolina), while even the various counties of many highly advanced commonwealths will not consent to regimentation. Many years must elapse before the infinite complexities of this nation can be conducted from a single center.

Course of the Enterprise and Consequences. Ultimately the effort results in an enormous bureaucracy. In Germany there are 2,000 more insurance administrators than physicians in Krankenkassen. The political control is injurious to the system, unfair to the patient, disheartening to the doctor and destructive to the proper practice of medicine.

The conduct of a compulsory and often almost universal health and medical service placed in the hands of a lay board, or commission, means that this vast project is entrusted to people wholly unfitted for the task and unfamiliar with its problems. Furthermore, such organizations soon become so powerful financially and politically that they cannot be altered or dislodged, as welfare workers are well aware.

When benefits are distributed to individuals through an extensive administration group with numerous employees, the combination quickly becomes a gigantic and extremely powerful political machine—a plaything of politics.

This very natural result advances the directoral body in power, but always affects the quality of medical service injuriously. Restrictions on scientific practice are imposed by lay administrators which benefit the politics and the treasury of the organization rather than the patient.

Effects of This Speculation Upon the Patient. Sickness insurance is a source of degradation and mental degeneration to the insured.

The patient malingers, or is suspected of it, and his feelings are hurt by the inquiry, or antagonized by discovery. Much time is wasted in bringing this fraud to light. Sickness insurance creates neuroses and prevents their proper and efficient treatment. The greed to get something back for money spent is always present among the insured and urges them to seek aid. Prescriptions, expensive and often not needed, are regularly demanded and either the patient is served or the doctor is criticized, even cashiered.

Sickness is often an economic problem rather than pathologic. Sickness insurance is a form of deadly infection which creates a constantly increasing amount of illness and emasculates the individual by depriving him of his courage, sense of responsibility and manhood. He becomes fundamentally a chronic and demoralized invalid.

In England fourteen out of one hundred claimed sickness benefits in 1921 and this grew to twenty-three in 1927. With unmarried women the proportion grew from twelve to twenty-one and for married women from nineteen to thirty-eight out of each hundred applicants.

According to estimates, from sixty per cent. to seventy-five per cent. of those who come for medical attention do not need it. If told so, they are displeased and flock to quacks who must be paid for their services. In only five of nineteen countries having National insurance were the patients satisfied with the service.

The occasional lack of adequate medical care, furthermore, results oftener from the indifference of the people than from economic stress. The Metropolitan Life Insurance Company learned from a house-to-house canvass of several thousand families that the majority of parents who had failed to have their children inoculated against diphtheria recognized its benefit and believed in preventive medicine but neglected to have it done. Would health insurance correct such heedlessness?

The entire history of health insurance has proved that "sickness" is an indefinable condition which is often coveted by the insured person with no desire to get well.

Effects Upon the Practice of Medicine. The practice of medicine is mechanized unduly, personal responsibility diminished, diagnosis crippled, research hampered and so much time wasted on the urgencies of the would-be sick that none is left for the really disabled.

The efforts of societies and lay boards are directed everywhere toward the destruction of the professional status and its replacement by an industrial contract.

The question of a free choice of physician is antagonized and restricted by the insurance administrator since only those doctors will be chosen, he contends, who are liberal with certificates of incapacity for work and generous with drugs, for all insurance schemes lead to expensive over-medication. German physicians report that the insured patients will use ten times as much medicine as the uninsured.

Effect Upon the Physicians. The insurance code demands constant expansion of medical service, while the management at the same time fights adequate medical compensation. The doctor is over-busy. He has no time to renovate his ideas by consulting the monthly records of medical progress.

The personal relation of patient and physician is destroyed and a purely cash connection retained with the organization. Commercialism is rampant and professional control of the medical problem eliminated. Insurance service is always second class, since the better practitioners will not apply. In only six of the nineteen countries having National insurance were the doctors satisfied with the service.

In view of these facts, the medical profession of Illinois feels that more prolonged study is required for the proper solution of this medical problem, and for the present the members of this Society desire opportunity to practice medicine as hitherto for the best interests of the public without domination by laymen, either social service workers, political appointees or any others who have no experience with difficulties inherent to medical practice.

In conclusion, let it be emphasized by repetition that all available statistics demonstrate that health conditions prevailing in Illinois are distinctly superior to those in the nation at large, and that the latter, as previously pointed out, easily surpass those in nations where Health Insurance schemes have been adopted.

Respectfully submitted,

ILLINOIS STATE MEDICAL SOCIETY,

CHARLES B. REED, M. D., Chairman.
CHARLES J. WHALEN, M. D.
JOHN R. NEAL, M. D.

IN MEMORY OF DR. CLEAVES BENNETT

We, the members of the Council of the Illinois State Medical Society, recognizing our obligation to physicians who have given freely of their time and ability to uphold the standards of the medical profession, and have loyally supported its organization, have occasion at times to pause and give due consideration.

The Illinois State Medical Society requires and has always had able leadership to direct the activities of its organization, but occasionally the "Grim Reaper" ruthlessly selects one of its outstanding men. This is particularly true in the case of Dr. Cleaves Bennett who answered the summons on December 24, 1934, at a time when strong men are needed in the medical profession.

Dr. Bennett was an outstanding man in the medical profession. His preparation at the University of Illinois laid a broad and sure foundation for his life's work. Always sincere and fearless, he ever commanded the respect and confidence of his colleagues. He did not seek preferment in office, but was ever keenly alive to the best interests of his profession. Fulfilling its highest ideals, he grew ripe in experience and fruitful in service. Serving seven years as Councilor from the Eighth District, he was given the honor of chairman of the Council for two years. His leadership in that important office was constructive and his judgment was sound.

By the untimely death of Dr. Cleaves Bennett, the State of Illinois has lost an honored citizen; the Illinois State Medical Society, an able advisor; the medical profession, a conscientious worker; and humanity, a friend.

Words cannot always express our thoughts at such times, but we wish to place on record that we admire him for his broad-minded charity and the integrity of his character; respect him for his candor, his sincere and direct address; honor him for his dependable judgment and love him for those strong and sterling qualities that distinguished him, a man.

We respectfully recommend that these sentiments be given a permanent place in the records of the Council of the Illinois State Medical Society and that a copy be sent to the bereaved widow as an expression of our deep and sincere sympathy for her in her great loss.

J. G. NAGEL,
J. S. TEMPLETON,
C. E. WILKINSON,
Committee.

MAYOR LA GUARDIA ON THE SPOT

The *New York Physician*, December, 1934, takes the New York Mayor to task. We quote:

MAYOR LAGUARDIA ON THE SPOT

By "A Doctor"

The Honorable Mayor, Fiorello H. LaGuardia, appeared in all his majesty before a meeting at the New York Academy of Medicine on December 6th and brought forth words which certainly were exceedingly irritating to a number of those present and even more irritating to the thousands of doctors who read in the newspapers the next day what he had to say. Comments such as these should have been answered at the meeting but there was no time for any doctor to get up to defend the medical profession so that it is necessary, at this late date, for some few of us to express our views.

Mayor LaGuardia is anxious to see the medical profession socialized. He is anxious to have every doctor placed on a salary basis. He wants all of us put in our little niche and told just what we can do and can not do. He does not tell us that if that time ever comes, the doctors of this country will be under complete political domination. Mr. LaGuardia is a politician and certainly he, if anybody, should know that one has to play the political game, he will stand to fall according to how near he can get to those who have the political power in their hands.

We are sick and tired of having Mayor LaGuardia and various other lay groups of people telling the medical profession what they should do. Certainly the profession in the past has shown that it can maintain itself successfully in spite of the various inroads that have been made upon it. And, strange as it may seem, they have been able to organize along scientific lines until the American medical profession is looked at with envy by groups of physicians in other countries. Is it not about time that we had an economic code which would meet with the approval of organized medicine and also with the approval of the public? As long as there are so

many projects with capital letters which are working for the public good, we should also have our capital letters. Let us have a National Medical Recovery Act—N. M. R. A.

We wish that our friend the Mayor were a doctor and dependent upon his income from practice to make a living for himself, his wife and two children. He might look at things from a different angle. He might be one of these men who had had a fair practice among people in moderate circumstances who had lost almost everything they had. And he might hold a city hospital dispensary job for which he was receiving not one red penny. Perhaps, under these circumstances he would like to be subsidized by the State but how would he feel when the time came that some other physician got a better job through his political influence?

MEETING OF AMERICAN CONGRESS OF PHYSICAL THERAPY

The American Congress of Physical Therapy announces a one day session of its Mid-Western Section, to be held in the Auditorium of the Service Memorial Institute, Madison, Wisconsin, Tuesday, March 12, 1935.

The morning session will be devoted to hospital clinics and the afternoon session to scientific papers. The evening program will be conducted under the joint auspices of the section and the Dane County Medical Society.

The Program is as follows. Clinics:

Wisconsin General Hospital, 9-10 a. m.—Physical Therapy in Fractures, James Jackson, M. D., Madison.

Wisconsin General Hospital, 10-11 a. m.—Physical Treatment in Postural Defects, Helen Denniston, M. D., Madison.

Children's Hospital of Wisconsin General Hospital, 11-12 a. m.—Physical Therapy in Poliomyelitis and in Postoperative Cases, J. C. Elsom, M. D., Madison.

Afternoon Session, 2 p. m.

Physical Therapy in Relation to Orthopedic Surgery, F. H. Ewerhardt, M. D., Assistant Professor of Physical Therapeutics, Washington University School of Medicine, St. Louis.

Management of Cancer of the Nasal Accessory Sinuses, Francis L. Lederer, M. D., Professor and Head of the Department of Laryngology, Rhinology and Otology, University of Illinois College of Medicine, Chicago.

Physical Therapy in Postoperative Conditions, Robert E. Burns, M. D., Associate Professor of Orthopedic Surgery, University of Wisconsin Medical School, Madison.

Status of Electrosurgical Resection, H. C. Rolnick, M. D., Professor of Urology, Loyola University Medical School, Chicago.

Physical Therapy in Relation to Arthritis, John Stanley Coulter, M. D., Associate Professor of Physical Therapy, Northwestern University Medical School; Council on Physical Therapy, American Medical Association.

Physical Therapy in Relation to General Surgery, Arnold S. Jackson, M. D., Jackson Clinic, Madison.

Evening Session 8 p. m.

Modern Concepts of Physical Therapy in Medicine and Surgery, Harry E. Mock, Sc. D., M. D., Associate Professor of Surgery, Northwestern University Medical School; Chairman Council on Physical Therapy of American Medical Association.

Aids in Rehabilitation, F. J. Gaenslen, M. D. (Milwaukee, Wis.), Professor of Orthopedic Surgery, University of Wisconsin Medical School, Madison, Wis., Council on Physical Therapy, American Medical Association.

For program, address Marion G. Smith, Executive Secretary, American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

TRANSACTIONS OF THE ILLINOIS STATE MEDICAL SOCIETY FOR SALE

We are in receipt of a letter from Phelix J. Underwood, M. D., executive officer, Mississippi State Board of Health, Jackson, Mississippi, which reads as follows:

Dear Editor: In trying to locate old copies of The Transactions of the Mississippi State Medical Association, I found that B. H. Murphy, bookdealer, 407 Church Street, Nashville, Tennessee, has the Transactions of the Illinois State Medical Society for the following years: 1878, 1879, 1881 and 1882.

I thought you might like to secure these copies.

ILLINOIS EMERGENCY RELIEF COMMISSION'S PRESENT MEDICAL PROGRAM

The physician has two distinct interests in the present administration of relief in Illinois. As a civic minded citizen, he is naturally interested in the efficiency of administration and in the adequacy of relief. As a professional man he is particularly interested in those phases of the relief program which bear upon the furnishing of medical aid to those who are being assisted.

A consideration of the present program of the Illinois Emergency Relief Commission shows that these two interests of the physician are inter-related. Consider first his interest as a professional man. The Illinois Emergency Relief Commission's present medical program, which was set up in conformance with the basic principles of medical relief developed by the Federal Emergency Relief Administration, provides for the furnishing of medical aid through what might be termed normal channels. The actual program was developed in cooperation with an advisory committee of the Illinois State Medical Society which is actively assisting in its administration. The patient selects his physician just as he would were he supporting himself through gainful employment. This characteristic of the medical program is important in a consideration of the entire relief program for it is symptomatic of the basic

principle upon which all relief is administered by the Illinois Emergency Relief Commission.

The Commission, in furnishing aid to the unemployed, has taken as a working principle that the family unit should be preserved and that this unit should be maintained in its normal relations to society, as far as this can be accomplished. In line with this principle, it not only furnishes relief to families as units, it also preserves many of the normal functions of family life. For example, it permits families receiving direct relief to obtain much of the food they require through local groceries and markets, and it enables many of the families it aids to earn their budgetry needs through gainful employment on work relief projects. It might be said in passing that more than 100,000 family heads are employed on work relief projects each month.

A study of the financing of medical relief in Illinois indicates certain definite trends in the relief movement. The present medical program was instituted about a year ago. In April of 1934, seventeen counties, exclusive of Cook, were participating. In these counties the cost of medical relief, exclusive of administration, was $23,556.69. In December, 1934, eighty-six downstate counties were participating at a cost of $126,930.66. These figures do not mean that relief is being given indiscriminately or that there have been serious epidemic conditions in a large number of our counties. They do, however, point to the definite fact that as the period of depression increases, the needs of relief families also increase, and that the Illinois Emergency Relief Commission has been obliged to assume increasing responsibilities.

The same has been true in other fields of relief administration. The problem of relief administration has grown increasingly complex. In the early stages of the depression, most families in need required the simplest kind of aid. As their period of enforced idleness extended, they needed more varied relief. In the meantime, local public and private funds became exhausted and an increasingly large proportion of the relief load had to be borne through state and Federal funds. The policy of financing medical aid is an example of this condition. During the early stages of the depression, the bulk of medical aid was furnished by members of the medical profession on a voluntary basis. Certain forms of it were financed by local governmental units. As the period of unemployment continued there became the necessity of developing some plan whereby physicians might be compensated for treatment given the unemployed who were receiving relief. In other fields, the necessity for further development of the relief program was necessary. The combined results of these various factors has been an expansion of the relief program coupled with the necessity of maintaining rigid controls over the various funds being used to finance it.

In its actual administration of relief, the Commission has adopted the policy of employing on a merit basis persons specially qualified for the type of work they are doing. Again, the medical program might serve as an example. It makes medical referrals to licensed practitioners, and in maintaining local controls works in cooperation with committees of the various county medical authorities. In the actual administration of direct relief, it employs persons who by training and experience are familiar with the problems involved in social welfare. In other phases of its administration it also adheres to this principle. Its food budgets are developed by nutritionists in cooperation with persons in direct touch with produce markets. It has sought engineering aid in the development of its work relief program and its funds are under the control of qualified accountants. This personnel set-up with its recognition of individual merit has enabled the Commission to maintain a rigid control over its expenditures and over case loads. In this connection, it should be pointed out that the increases in relief loads throughout the state during the fall and winter months are in all cases considerably below the normal seasonal increases for these periods.

The foregoing explanation of the operations of the Illinois Emergency Relief Commission are given here because the members of the medical profession have a special interest in welfare activities in their state and the administration of relief is the most outstanding operation in this field. It is essential that members of the profession know the basic principles under which relief is administered and that they realize that the medical program is an intricate part of the Commission's program and that the basic principles of relief administration are embodied in it.

Wilford S. Reynolds, Executive Secretary,
Illinois Emergency Relief Commission.

FLAT RATE FEES CONDEMNED

We quote the following from the *Detroit Medical Times:*

The House of Delegates of the Michigan State Medical Society at its 1933 meeting studied the problem of institutions charging flat fees for combined hospital and medical services. The following resolution was presented condemning the practice of flat rates as a system which would result in a lowering of the quality of service given the public. Too often do flat-rate-fee patients receive the service of internes and residents when they believe they are receiving medical attention from staff members; many people also erroneously believe that the payment they make to the institution includes a fee to the physician; few realize that the entire flat-fee charge goes to the hospital.

The Michigan State Medical Society resolution on this abuse is as follows:

"WHEREAS: Hospital Insurance has been, is being and will be promoted by various hospitals, companies and groups, therefore

"Be It Resolved: That members of county medical societies be requested to decline to render service under these policies that also include professional care unless the remuneration for services is approved by the county medical society and the plan or insurance provides for free choice of physician and hospital, and

"Be It Resolved: That any member who violates these conditions shall have his membership terminated

and be no longer eligible for membership in his county medical society, and,

"Be It Resolved: That a copy of this resolution be sent to the officers of every County Society and hospital superintendent."

WHO HAVE BEEN THE ADVOCATES OF SICKNESS INSURANCE?

The most significant general fact is that in no country have either the physicians who are to give the service or the proposed beneficiaries of that service ever asked for it. In most countries its introduction was opposed by both groups. In a few countries in recent years, where voluntary insurance societies had been organized among laborers and found themselves in financial difficulties, these societies were able to secure the support of their members and sometimes of the political parties of labor for state subsidies and then for a compulsory system. The demand in these cases does not appear to have come from the membership but from the officials of the societies that were in financial difficulties and from the labor politicians who saw in the societies an extensive political machine. The first advocates of sickness insurance have almost always been social workers and philanthropists. These groups and individuals see in sickness insurance a simplification of their work in providing medical relief. Neither are they blind to the fact that the introduction of a system of sickness insurance will involve the employment of large numbers of such social workers.—From "Sickness Insurance Catechism."

A. M. A. SPECIAL MEDICAL BROADCAST PROGRAM

The American Medical Association will broadcast on a special program arranged through the courtesy of the National Broadcasting Company over a network of stations, beginning at 6 p. m., eastern standard time, Monday, February 18. The program will include music and three speakers from among physicians in attendance at the Annual Congress on Medical Education and Medical Licensure, meeting in Chicago on that day. The speakers and their topics are as follows:

Advancement of Medical Education, Walter L. Bierring, M.D.

The Prolongation of Life, Ray Lyman Wilbur, M.D.

The Battle Against Tuberculosis, Kendall Emerson, M.D.

EDUCATIONAL COMMITTEE

January Activities

VIVISECTION:

As vivisection is a subject demanding much attention at this time, the Educational Committee has supported the medical scientists in bringing to the public true information concerning the laboratories and the results of animal experimentation. Through the Committee it has been possible to arrange programs, with speakers from the medical schools, to appear before high school students, men's clubs, women's groups, church societies, Y. M. C. A.'s.

HEALTH INSURANCE:

Organizations are beginning to ask questions about Health Insurance and Socialized Medicine. Package libraries have been compiled for physicians and a number of speakers have been scheduled to address lay groups on this important subject.

SCIENTIFIC SERVICE:

14—Scientific speakers were scheduled to give programs in

Scott County, Iowa
Rock Island County
Will-Grundy County
Kankakee County
Paris Hospital Staff
LaSalle County
Whiteside County
Warren County

298—Notices were sent out to doctors announcing the LaSalle County Medical Society meeting.

49—Newspapers received a story of this meeting.

212—Notices were sent to physicians announcing the January meeting of the Jefferson-Hamilton County Medical Society.

282—Notices were sent to physicians announcing the January meeting of the Whiteside County Medical Society.

57—Newspapers received a story announcing the Whiteside County Medical meeting.

129—Notices were sent to physicians regarding the Randolph County Medical Society meeting on January 24th.

220—Physicians were sent invitations to attend the Bureau County Medical Society meeting.

54—Newspapers were sent stories of the Bureau County meeting.

Notices were sent out to newspapers announcing scientific programs given by Chicago Medical Society and the following branches: Northwest, Calumet, Douglas Park, North Shore.

RADIO:

25—Radio talks were given during the month from stations WGN, WAAF, WJJD and WBBM. The manager of radio station WBBM (Columbia Broadcasting Company) has asked us to sponsor a program every other Wednesday from 12:45 to 1:00 o'clock. These programs, which began on January 23, will be continued indefinitely.

Requests have been received during the month from our audience in Illinois, Iowa, Michigan, Indiana, Wisconsin, Missouri.

At the present time the Committee is arranging programs for the radio covering a total of sixty minutes each week. The Educational Committee probably is given more time over the air than any other organization in the state and we are indeed grateful for this opportunity of bringing correct information to the public.

Radio station WGN sent the Committee a letter

from the principal of schools at North Manchester, Indiana, asking that he be put on the mailing list to receive copies of all health talks given from that station to be used as reference material by the physiology students.

SPEAKERS BUREAU:

40—Health programs were arranged and speakers secured to give popular talks in nineteen different cities of Illinois. These talks were presented by members of the Illinois State Medical Society. A number of health lectures were arranged for high schools, the largest assembly numbering 2,000 boys and girls.

Some groups seem to like the idea of having series of lectures on popular health subjects. The committee has been asked to plan such programs for the Springfield Y. M. C. A., Central Y. M. C. A. of Chicago and Wilson Avenue, Englewood, Sears Roebuck branches of Chicago, the Lake College of Commerce of Waukegan.

LIBRARIES:

137—Libraries in Illinois are now receiving every week from the Educational Committee, health articles on prevalent conditions or subjects of current interest for posting on bulletin boards and for filing with reference material.

PRESS SERVICE:

1210—Press releases during the month of January. The clipping service to which the Educational Committee subscribes indicates that the material is widely used throughout the state, but also shows that it could be increased.

Articles were written and approved for release on the following subjects:

"Why Do Feet Hurt?"
Silver Used as Medicine.
Your Gall Bladder.
About Cancer.
Periodic Physical Examinations.

MISCELLANEOUS:

Package libraries compiled for clubs and for physicians.

Information on the work and set-up of the Speakers Bureau supplied the American Bar Association.

Outline of radio programs and policies furnished district medical society of South Dakota.

Information on Speakers Bureau supplied for publication in the handbook of the Illinois Congress of Parents and Teachers.

1,055—Notices, letters, etc., mimeographed for the Woman's Auxiliary.

Special service to Chicago Medical Society in promoting the January meeting for the laity:

Letters and posters to Chicago ministers.

Letters sent to doctors with cards to be mailed to patients.

Letters to women's clubs and Parent Teacher Associations.

Announcements and posters to all clubs of prominence.

Stories to all newspapers in Chicago.

Respectfully submitted,

JEAN MCARTHUR, Secretary.

MAYO FOUNDATION PROGRAM

A special program of lectures and demonstrations in medicine will be held under the direction of The Mayo Foundation from March 4 to 8, inclusive. Mornings will be devoted to surgical and medical clinics. In the afternoons and evenings symposiums will be conducted on urology, acute abdominal conditions, pediatrics, gastro-enterology, the thyroid and parathyroid glands, and dermatology. In addition, two clinico-pathologic conferences will be held. On Friday evening, March 8, the Minnesota Trudeau Society will hold an open meeting.

While these programs are arranged primarily for the Fellows of the Foundation, visiting physicians are invited to attend.

UNITED STATES CIVIL SERVICE EXAMINATION

The United States Civil Service Commission has announced an open competitive examination as follows:

JUNIOR MEDICAL OFFICER (INTERNE)
St. Elizabeth's Hospital

Applications for the position of Junior Medical Officer (Interne) at St. Elizabeth's Hospital, Washington, D. C., must be on file with the Manager of the Fourth U. S. Civil Service District, Washington, D. C., not later than February 18, 1935.

Two types of interneship are offered, as follows:

(a) An accredited interneship of two years (American Medical Association classification 1), consisting of a rotating service of four months of surgery, four months of acute medical service, four months of chronic medical service, six weeks of obstetrics (affiliation), six weeks of pediatrics (affiliation), three months of general laboratory work, and six months of psychiatry.

(b) A postgraduate interneship of one year in psychiatry (American Medical Association classification 2). For this interneship physicians who have already had an accredited interneship are desired, although applications from those who have not had an accredited interneship will be accepted.

Applicants must have been graduated from a medical school of Class A standing with the degree of doctor of medicine.

Applications will be accepted from fourth-year students in schools which require a year of interneship before granting the M. D. degree (5 years in all), as senior students to serve the interne year, and from senior students in other schools subject to their furnishing proof of graduation during the existence of the eligible register.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or the second class,

or from the United States Civil Service Commission, Washington, D. C.

UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission has announced open competitive examinations as follows:

Principal Pharmacologist.
Senior Pharmacologist.
Pharmacologist.
Associate Pharmacologist.
Assistant Pharmacologist.

Applications for the positions named above, for employment under the Food and Drug Administration, Department of Agriculture, must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than March 11, 1935.

The entrance salaries range from $2,600 a year for the assistant grade to $5,600 a year for the principal grade, subject to a deduction of not to exceed 5 per cent during the fiscal year ending June 30, 1935, as a measure of economy, and also to a deduction of 3½ per cent toward a retirement annuity.

Certain specified education and experience are required.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or the second class, or from the United States Civil Service Commission, Washington, D. C.

LEGISLATIVE ACTIVITIES AND THE WOMAN'S AUXILIARY

It seems quite probable that the coming months offer the greatest opportunity for usefulness since the Woman's Auxiliary to the Illinois State Medical Society was organized in 1927.

The objects of the Auxiliary as stated in its constitution are:

1. To assist the Illinois State Medical Society in the advancement of the prevention of disease.
2. To aid in securing better legislation indicated in the pursuance of these ends.
3. To do such other supplemental work as shall be determined from time to time by the Medical Society in the advancement of professional interests.

It is quite evident that if we as an auxiliary expect to assist the Illinois State Medical Society in the advancement of the prevention of disease and to aid in securing better legislation to the pursuance of these ends, we must first inform ourselves.

To be convincing one must be accurately informed and with this in view your state program chairman has prepared and sent to each auxiliary excellent program suggestions, which will, if carried out, aid in correcting misinformation.

If our greatest worth to the medical profession be in helping to educate and mold public opinion then we probably shall not want for a field of labor during the coming months. The President in his message to the present Congress assured his listeners that in a very short time he would send to Congress recommendations which would cover, among other things, benefits for maternity care and for other aspects of dependency and illness. Legislation proposed to carry out these recommendations must necessarily follow and quite probably our Woman's Clubs and similar organizations will again be asked to endorse legislative measures designed to play upon the sympathies of the uninformed.

We are indebted to Dr. John R. Neal, Chairman of the Legislative Committee of the Illinois State Medical Society, who, upon request, kindly prepared the valuable suggestions regarding Illinois state legislation which are appended.

URGENT WORK FOR THE WOMAN'S AUXILIARY

There is work ahead for the Woman's Auxiliary of the Illinois State Medical Society, plenty of work and of the most constructive character. Of pressing urgency at the moment is the matter of animal experimentation, ordinarily referred to as vivisection. The privilege of animal experimentation is of vital importance to progress in medicine. That privilege is under challenge by the anti-vivisectionists who are supported in their program by an annual income of millions of dollars.

At the present session of the Illinois General Assembly, a bill prohibiting animal experimentation, at least on dogs, will be introduced. Similar bills will be introduced (if not already before legislative bodies) in thirty-two (32) other states this year. The next step in this national movement, if the program succeeds this year, will be to amend the Constitution of the United States so as to make animal experimentation illegal in America. This has been the cause of fanatical legislation in this country.

These bills will be pushed with all the vigor that money and high caliber lobbyist can command. Perhaps never before has pressure in favor of anti-vivisection measures been equal to that which is being exerted this year on legislative bodies. Whether or not any of this legislation succeeds the movement will not die down with the end of the legislative season. The anti-vivisectionists have financial resources from the income of heavy endowments. The movement will therefore continue indefinitely in the future. There will be no cessation of effort.

This situation makes necessary the marshaling together of all available strength on the part of the friends of medicine, of science and of progress against disease. These forces must be organized to function permanently and efficiently.

The Woman's Auxiliary of the Illinois State Medical Society has the opportunity of doing effective work in connection with this particular problem, as well as in respect to many other anti-medical movements, that are sure to arise. In the first place there should be organized an active woman's auxiliary in connection with every county medical society in the State. These auxiliaries should meet regularly and discuss the problems that face the medical profession, especially such things as anti-vivisection and the socialization of medicine.

Secondly, the members of the woman's auxiliary

should make it their business to join the local woman's club, the local parent-teacher association, the local chapter of the American Association of University Women, the local Business and Professional Women's Club, local women's political clubs and every other worthwhile organization open to membership by women. At least one representative of the auxiliary should be an active member of each organization of consequence in the community.

Thirdly, the members of the auxiliary should initiate, when necessary, the appointment of legislative committees in the various women's organizations and make it their business to see that some representative of the auxiliary is a member of the legislative committee. The function of this committee would be to keep itself informed on important legislative matters and to guide the thought of the organization along sound lines. The representative of the auxiliary should make it her special duty to keep informed about legislation that concerns the medical profession and see that appropriate committee action is taken. Information and guidance along this line can always be secured promptly from the Legislative Committee of the Illinois State Medical Society.

An organization of the character outlined would open up to the medical profession and all friends of scientific thought and progress a channel through which a powerful influence over public opinion could be exercised.

Members of the organized medical profession in Illinois have not been idle on the problem of animal experimentation. They have already laid the groundwork for effective opposition to anti-vivisection efforts. It is probable that a bill for the regulation of animal experimentation will be introduced. This counter movement will require a united front on the part of the friends of medical science. Organized effort on the part of the auxiliary will be important.

Success of the friends of medical science in Illinois would have a powerful influence on the trend of legislation in other states.

It seems almost superfluous to reiterate the reasons why animal experimentation is important. The State Department of Public Health recently published data which show that the use of insulin saves the lives of at least 170 young people annually Illinois and greatly prolongs the lives of hundreds of others. The discovery of insulin resulted from experimentation on dogs and could not very well have been discovered in any other way. The evidence that 170 people are saved annually in Illinois is found by comparing the number of deaths from diabetes among people under forty-five years of age in 1923, the year after insulin was discovered but before it came into general use, and in 1933 after insulin had become an established factor in the treatment of diabetics.

At the present time experimental work of the most promising character looking toward the control of peptic ulcers is being done on animals in the research laboratories of Illinois. To prohibit the use of dogs for experimental purposes would stop this vital research activity and perhaps close the doors of progress forever in this field.

Literature relating to animal experimentation and its importance to medical science may be obtained from the State Department of Public Health at Springfield, or from the Educational Committee of the Illinois State Medical Society, 185 North Wabash Avenue, Chicago, or from Dr. C. I. Reed, College of Medicine, University of Illinois, 1853 West Polk Street, Chicago.

The immediate and pressing job of the auxiliary is to organize itself along the lines suggested and be prepared to function effectively in respect to the legislative problem of animal experimentation as well as in connection with other matters that are sure to arise. Action on matters relating to legislation should be guided by the Legislative Committee of the Illinois State Medical Society.

WOMAN'S AUXILIARY TO THE ILLINOIS STATE MEDICAL SOCIETY

Work for the Year

1. Familiarize yourself with Medical Legislation program.
2. Educate the lay as to the value of Organized Medicine.
3. Educate as to the effect of State Medicine on public.
4. Aid in exposing the misrepresentation carried on by cure-all companies, especially over the Radio.
5. When the doctor's fee bill is criticized as being too high, kindly remind the people with reference to the amount of charity work the doctors give.
6. Stress Public Relations.
7. When medical subjects are to be discussed in clubs and lay organizations see to it that a physician of merit is the speaker.
8. Place *Hygeia* in schools, high schools, libraries and county or district schools.
9. Place authorized Medical Books in your libraries. If you can't buy them maybe some of the Doctors would donate from their library a volume. See that a space is given to Medical Books.
10. Compiling a list of public reading rooms where we can place *Illinois Health Messenger.*
11. Use films in schools and clubs furnished through Illinois State Health Department, free.
12. Use speakers Bureau of Illinois State Medical Society.
13. Read the Journals, State and National.
14. Know both sides of the question.
15. Know the merits of vivisection.
16. What has anti-vivisection given the public in health measures?
17. Distribute booklet being prepared by Economic Committee of State Society.
18. Know the Doctors' wives in your community and create a friendly spirit among them.
19. Cooperation, unity of Auxiliary members, knowledge and sincere understanding will make strength with which we can stand behind our husbands and their difficult problems, and be of great assistance to them and the Medical Society. Can we? We will!

The above are suggestions I am asking the County Auxiliary to carry out this year. Particularly am I

anxious that Mrs. A. H. Brumback be sent a mailing list of all public waiting and reading rooms in the counties, so that copies of *"The Illinois Health Messenger"* may be placed there. We feel this is an excellent way to counteract the unethical health literature of quacks, cults, cure alls, and the *Christian Science Monitor,* which are always very prevalent in such places. Please make every effort to co-operate in this matter. It is important.

Mrs. Lucius Cole, President

SANGAMON COUNTY AUXILIARY MEETS

The December meeting was held in the University Club at Springfield, a large number being present. Dr. J. R. Neal spoke on Legislative matters to come up in the next session and urged all to be ready to help. The society is becoming more of a success at every meeting as the members become more enthusiastic.

Suzan Helen Flentje.

SALINE COUNTY AUXILIARY MEETS

The Saline County Auxiliary met with the Saline County Medical Society at the home of Mr. and Mrs. W. T. Johnson for their Christmas meeting. A delicious turkey dinner was served. Following the dinner a program was enjoyed.

Mrs. J. H. Gregory.

DON'T FORGET YOUR INCOME TAX REPORT

The following from the Department of Legal Medicine and Legislation of the A. M. A. of which Dr. William C. Woodward is Director should prove a great aid to doctors in making out income tax report:

The Revenue Act of 1934, under which federal income tax returns must be filed on or before March 15 next, effects numerous changes in the prior income tax law. No such change, however, relates to physicians as a class distinct from the main body of federal income taxpayers.

Every one who is required to make a federal income tax return must do so on or before March 15, unless an extension of time for filing his return has been granted. For cause shown, the collector of internal revenue for the district in which the taxpayer files his return may grant such an extension, on application filed with him by the taxpayer. This application must state fully the causes for the delay. Failure to make a return may subject the taxpayer to a penalty of 25 per cent. of the amount of the tax due.

The normal rate of tax on residents of the United States and on all citizens of the United States regardless of their places of residence, under the Revenue Act of 1934, is 4 per cent on net income in excess of the exemptions and credits.

WHO MUST FILE RETURNS

1. Returns must be filed by every person whose gross income in 1934 was $5,000 or more, regardless of the amount of his net income and of his marital status. If the aggregate gross income of husband and wife, living together, was $5,000 or more, they must file either a joint return or separate returns, regardless of the amounts of their joint or individual net incomes.

2. If gross income was less than $5,000, a return must be filed (*a*) by every unmarried person, and by every married person not living with her husband or his wife, whose net income was $1,000 or more, and (*b*) by every married person living with her husband or his wife, whose net income was $2,500 or more. If the aggregate net income of husband and wife, living together, was $2,500 or more, each may make a return or the two may unite in a joint return.

If the status of a taxpayer, so far as it affects the personal exemption or credit for dependents, changed during the year, the personal exemption and credit must be apportioned, under rules and regulations prescribed by the Commissioner of Internal Revenue with the approval of the Secretary of the Treasury, in accordance with the number of months before and after such change. For the purpose of such apportionment a fractional part of a month should be disregarded unless it amounts to more than half a month, in which case it is to be considered as a month.

As a matter of courtesy only, blanks for returns are sent to taxpayers by the collectors of internal revenue, without request. Failure to receive a blank does not excuse any one from making a return; the taxpayer should obtain the necessary blank from the local collector of internal revenue.

The following discussion covers only matters relating specifically to physicians. Full information concerning questions of general interest may be obtained from the official return blank and from the collectors of internal revenue.

GROSS AND NET INCOMES: WHAT THEY ARE

Gross Income.—A physician's gross income is the total amount of money received by him during the year for professional services, regardless of the time when the services were rendered for which the money was paid, plus such money as he has received as profits from investments and speculation and as compensation and profits from other sources.

Net Income.—Certain professional expenses and the expenses of carrying on any enterprise in which the physician may be engaged for gain may be subtracted as "deductions" from the gross income, to determine the net income on which the tax is to be paid. An "exemption" is allowed, the amount depending on the taxpayer's marital status during the tax year as stated above. These matters are fully covered in the instructions on the tax return blanks.

Earned Income.—In computing the normal tax, but not the surtax, there may be subtracted from net income from all sources an amount equal to 10 per cent of the earned net income, except that the amount so subtracted shall in no case exceed 10 per cent of the net income from all sources. Earned income means professional fees, salaries, and wages received as compensation for personal services, as distinguished from receipts from other sources.

The first $3,000 of a physician's net income from all sources may be regarded under the law as earned net

income, whether it was or was not in fact earned within the meaning set forth in the preceding paragraph. Net income in excess of $3,000 may not be claimed as earned unless it in fact comes within that category. No physician may claim as earned net income any income in excess of $14,000.

DEDUCTIONS FOR PROFESSIONAL EXPENSES

A physician is entitled to deduct all current expenses necessary in carrying on his practice. The taxpayer should make no claim for the deduction of expenses unless he is prepared to prove the expenditure by competent evidence. So far as practicable, accurate itemized records should be kept of expenses and substantiating evidence should be carefully preserved. The following statement shows what such deductible expenses are and how they are to be computed:

Office Rent.—Office rent is deductible. If a physician rents an office for professional purposes alone, the entire rent may be deducted. If he rents a building or apartment for use as a residence as well as for office purposes, he may deduct a part of the rental fairly proportionate to the amount of space used for professional purposes. If the physician occasionally sees a patient in his dwelling house or apartment, he may not, however, deduct any part of the rent of such house or apartment as professional expense; to entitle him to such a deduction he must have an office there, with regular office hours. If a physician owns the building in which his office is located, he cannot charge himself with "rent" and deduct the amount so charged.

Office Maintenance.—Expenditures for office maintenance, as for heating, lighting, telephone service and the services of attendants, are deductible.

Supplies.—Payments for supplies for professional use are deductible. Supplies may be fairly described as articles consumed in the using; for instance, dressings, clinical thermometers, drugs and chemicals. Professional journals may be classified as supplies, and the subscription price deducted. Amounts currently expended for books, furniture and professional instruments and equipment, "the useful life of which is short," generally less than one year, may be deducted; but if such articles have a more or less permanent value, their purchase price is a capital expenditure and is not deductible.

Equipment.—Equipment comprises property of a more or less permanent nature. It may ultimately wear out, deteriorate or become obsolete, but it is not in the ordinary sense of the word "consumed in the using."

The cost of equipment, such as is described above, for professional use, cannot be deducted as expense in the year acquired. Examples of this class of property are automobiles, office furniture, medical, surgical and laboratory equipment of more or less permanent nature, and instruments and appliances constituting a part of the physician's professional outfit, to be used over a considerable period of time, generally over one year. Books of more or less permanent nature are regarded as equipment and the purchase price is therfore not deductible.

Although the cost of such equipment is not deductible in the year acquired, nevertheless it may be recovered through depreciation deductions taken year by year over its useful life, as described below.

No hard and fast rule can be laid down as to what part of the cost of equipment is deductible each year as depreciation. The amount depends to some extent on the nature of the property and on the extent and character of its use. The length of its useful life should be the primary consideration. The most that can be done is to suggest certain average or normal rates of depreciation for each of several classes of articles and to leave to the taxpayer the modification of the suggested rates as the circumstances of his particular case may dictate. As fair, normal or average rates of depreciation, the following have been suggested: automobiles, 25 per cent. a year; ordinary medical libraries, x-ray equipment, physical therapy equipment, electrical sterilizers, surgical instruments and diagnostic apparatus, 10 per cent. a year; office furniture, 5 per cent. a year.

The principal governing the determination of all rates of depreciation is that the total amount claimed by the taxpayer as depreciation during the life of the article, plus the salvage value of the article at the end of its useful life, shall not be greater than its purchase price, or, if purchased before March, 1913, either its fair market value as of that date or its original cost, whichever may be greater. The physician must in good faith use his best judgment and claim only such allowance for depreciation as the facts justify. The estimate of useful life, on which the rate of depreciation is based, should be carefully considered in his individual case.

In a Treasury decision, approved Feb. 28, 1934, No. 4422, it is held, among other things, that

1. The cost to be recovered shall be charged off over the useful life of the property.

2. The reasonableness of any claim for depreciation shall be determined on the conditions known to exist at the end of the period for which the return was made.

3. Where the cost or other basis of the property has been recovered through depreciation or other allowances, no further deduction for depreciation shall be allowed.

4. The burden of proof will rest on the taxpayer to sustain the deduction claimed.

5. The deduction for depreciation in respect to any depreciable property for any taxable year shall be limited to such ratable amount as may reasonably be considered necessary to recover during the remaining life of the property the unrecovered cost or other basis.

Particular attention is called to the last of the foregoing provisions. If, in prior years, rates have been claimed which, if continued, will fully depreciate the cost, less salvage, before the end of its useful life, based on conditions now known, a reestimate of the remaining useful life should now be made and the portion of the cost that had not been depreciated at the beginning of the year 1934 (for a return for the year 1934) should be spread over this reestimated life.

Medical Dues.—Dues paid to societies of a strictly professional character are deductible. Dues paid to social organizations, even though their membership is limited to physicians, are personal expenses and not deductible.

Postgraduate Study.—The Commissioner of Internal Revenue holds that the expense of postgraduate study is not deductible.

Traveling Expenses.—Traveling expenses, including amounts paid for transportation, meals and lodging, necessarily incurred in professional visits to patients and in attending medical meetings for a professional purpose, are deductible.

Automobiles.—Payment for an automobile is a payment for permanent equipment and is not deductible. The cost of operation and repair, and loss through depreciation, are deductible. The cost of operation and repair includes the cost of gasoline, oil, tires, insurance, repairs, garage rental (when the garage is not owned by the physician), chauffeur's wages, and the like.

Deductible loss through depreciation of an automobile is the actual diminution in value resulting from obsolescence and use and from accidental injury against which the physician is not insured. If depreciation is computed on the basis of the average loss during a series of years, the series must extend over the entire estimated life of the car, not merely over the period in which the car is in the possession of the present taxpayer.

If an automobile is used for professional and also for personal purposes—as when used by the physician partly for recreation, or so used by his family—only so much of the expense as arises out of the use for professional purposes may be deducted. A physician doing an exclusive office practice and using his car merely to go to and from his office cannot deduct depreciation or operating expenses; he is regarded as using his car for his personal convenience and not as a means of gaining a livelihood.

What has been said with respect to automobiles applies with equal force to horses and vehicles and the equipment incident to their use.

MISCELLANEOUS

Laboratory Expenses.—The deductibility of the expenses of establishing and maintaining laboratories is determined by the same principles that determine the deductibility of corresponding professional expenses. Laboratory rental and the expenses of laboratory equipment and supplies and of laboratory assistants are deductible when under corresponding circumstances they would be deductible if they related to a physician's office.

Losses by Fire or Other Causes.—Loss of and damage to a physician's equipment by fire, theft or other cause, not compensated by insurance or otherwise recoverable, may be computed as a business expense and is deductible, provided evidence of such loss or damage can be produced. Such loss or damage is deductible, however, only to the extent to which it has not been made good by repair and the cost of repair claimed as a deduction.

Insurance Premiums.—Premiums paid for insurance against professional losses are deductible. This includes insurance against damages for alleged malpractice, against liability for injuries by a physician's automobile while in use for professional purposes, and against loss from theft of professional equipment and damage to or loss of professional equipment by fire or otherwise. Under professional equipment is to be included any automobile belonging to the physician and used for strictly professional purposes.

Expense in Defending Malpractice Suits.—Expenses incurred in the defense of a suit for malpractice are deductible as business expense.

Sale of Spectacles.—Oculists who furnish spectacles, etc., may charge as income money received from such sales and deduct as an expense the cost of the article sold. Entries on the physician's account books should in such cases show charges for services separate and apart from charge for spectacles, etc.

INDICATIONS FOR THERAPEUTIC ABORTION FROM THE STANDPOINT OF THE NEUROLOGIST AND THE PSYCHIATRIST

Clarence O. Cheney, New York (Journal A. M. A., Dec. 22, 1934), reviews some of the opinions of neurologists and psychiatrists on therapeutic abortion and reports a number of specific cases of mental disorders, involving the question of abortion, from which he concludes that: 1. There appears to be no individual neurologic or psychiatric disorder that is an absolute indication for abortion in women suffering from such disorders. 2. Experience shows that some women with severe advanced neurologic disorders may go through pregnancy and have healthy children. 3. Experience shows that some women suffering from severe mental diseases may pass through normal pregnancy and childbirth. 4. Experience shows that abortion does not necessarily prevent a recurrence of mental attacks or bring about recovery from attacks already existent. The pregnant woman's general physical condition must be given careful consideration in a decision regarding the termination of pregnancy.

FOOD VALUE OF BEER

The food value of beer as measured by calories is not wholly dependent on the alcoholic content. For example, Lusk states that "a liter of German beer contains from 3 to 4 per cent. of alcohol and from 5 to 6 per cent. extractives. It yields 450 calories to the body, only half being derived from alcohol, the rest from dextrin and protein-like extractives. Here is a food material whose 'fattening' properties may be very highly considered." Christie has considered the same subject in relation to the nutritive value of other fluids containing alcohol. While the number of calories per ounce of the malt liquor is for the most part lower than that of an equal quantity of wines, liqueurs and spirits, the former are usually taken in much larger quantities that the latter and hence the total calory intake is generally more. Christie concludes, therefore, that light beers are ideal for the undernourished, and if the calories of beer are added to those of the usual diet there would seem to be no doubt of the practical value of his statement.—Jour. A. M. A., Dec. 22, 1934.

Original Articles

X-RAY AND RADIUM TREATMENT OF CANCER OF THE BREAST

GENTZ PERRY, M. D.,
EVANSTON, ILLINOIS

In an article on radium therapy read before the Evanston Branch of the Chicago Medical Society in October, 1930, I stated:[1] "Surgery and radio-therapy are not competitors. Many patients need both forms of treatment. No man is strong enough and intelligent enough to be both an expert surgeon and an expert radiologist and successfully practice both lines of work. The most skilful surgeons and the most skilful radiologists are rapidly realizing these facts, and the better class of radiologists and surgeons are now working in harmonious co-operation for the benefit of their patients."

In 1931 in a paper on "Treatment of Breast Cancer," I stated:

"The medical profession are constantly coming to a more complete agreement upon the treatment of mammary carcinoma. This agreement has doubtless proceeded to the stage of a fairly common opinion that, in the average case of breast cancer, whether it be a squamous cell type, an adenocarcinoma, or a mixture of both, the patient is given the best chance for recovery if we use a combination of radiotherapy, surgery and general medicine in treating the case."

"However, there does not seem to be a complete understanding between the different members of the medical profession as to the precise manner in which these various forms of treatment should co-operate. Doubtless, different cases require somewhat different plans of procedure in order to give each patient the best possible chance for recovery and I do not wish to be dogmatic in the laying down of rules of treatment. However, there are certain basic facts that we believe apply to all of the ordinary cases of this type, and a definite plan of treatment that it is ordinarily best to follow out in all cases that do not show either Roentgen evidence or other physical evidence of metastases to the spine, lungs or other vital organs."

In that same paper on "Treatment of Breast Cancer" I also stated:[2]

"When Halsted, Gross and other prominent surgeons developed the 'radical breast operation' which, as we all know, includes the removal of the pectoral muscles and axillary glands and fat, as well as the entire breast, we followed their teaching and performed that operation in breast carcinoma cases. Fifteen years ago it was probably the best thing that could then be done. At the present time we have a more certain means of clearing up the newly forming but invisible metastases which may be developing in the axilla or elsewhere. Unless there are plainly palpable, hard and firm masses in the axillary, infra- or supraclavicular regions, it is probably better to treat these regions by radiotherapy and not invade them surgically. In my opinion this statement will be undisputed ten years from now."

We have obtained our best results by the following general plan of treatment:

1. Giving the patient a thorough and heavy dosage of x-ray, using the "cross fire" method by radiating the malignant areas and the adjacent lymphatic drainage areas therefrom, by 200 KV voltage, 60 cm. distance, using a "Thoraeus" filter which is equivalent to 2 mm. of copper plus 1 mm. of aluminum filter, throwing four-fifths, or 4000 "r" of the total dosage of x-ray so that the rays go through the tissues to be treated, tangential to the ribs under the area radiated. (See Figure 1.) This illustration represents the patient lying upon her right side with the right axilla and shoulder, breast and right two-thirds

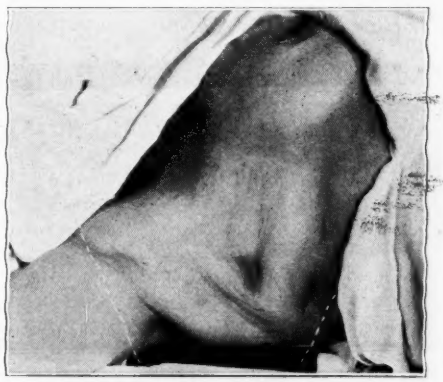

Fig. 1. Treatment of right breast by x-ray coming up from tube below patient.

of the anterior chest wall extending over the edge of the sheet lead, described in Figure 5, in such a manner as to receive the x-rays coming up from the tube below the patient. In this position there will be a small area of the pleura in the right anterior chest wall area that will get some direct irradiation. Other than this, the patient's lungs are getting no x-ray except what they are getting from the "back scatter" from the areas above mentioned as being in the direct line of the x-ray. The dotted lines show the divergence of the x-ray beam upward through the shoulder and downward along front wall of patient's thorax. Fig-

Read before Section on Radiology at Meeting of Illinois State Medical Society at Springfield, May 16, 1934.

ure 2 shows another patient in the same position as is shown in Figure 1. This is one of those rather rare cases of breast malignancy in the male sex. He was treated with a combination of x-ray and radium therapy early in 1932. No surgery was used. Pathologist's report on biopsy before treatment was squamous cell carcinoma.

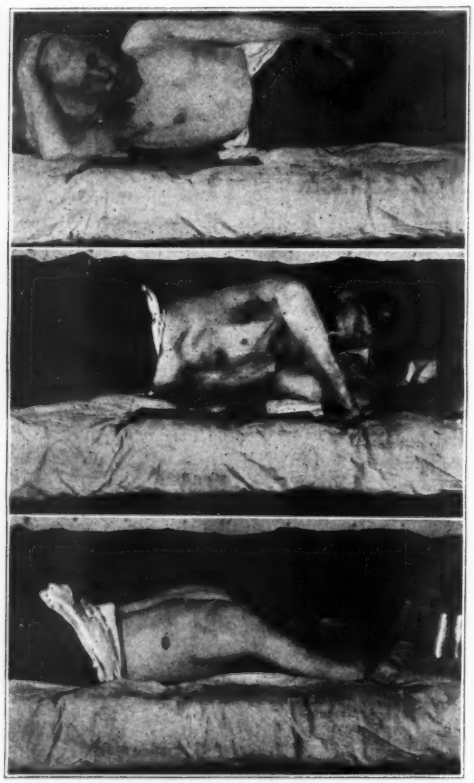

Fig. 2 (above). Showing another patient in same position as Fig. 1.

Fig. 3 (middle). Same patient as Fig. 2 being treated from left antero-lateral position of tube which, as before, is below patient.

Fig. 4 (bottom). Patient in position to receive x-ray directly through chest wall, mediastinum, lung, etc., directly from front.

This patient has shown no signs of a recurrence of his malignancy up to this date. In Figure 2 note the four-double sheet of lead rubber between the pillow and the patient's head. This precaution is necessary if we are to save the patient's hair during intensive treatment of this sort.

Figure 5 shows the large pieces of quarter-inch lead which we use to modify the size of the treatment area through which patient receives x-ray from the therapy tube in the Standard treatment couch which we use in treating these patients. Of course, the inner edge of either sheet of lead may be moved to the center of the opening so as to exactly bisect the total area of x-ray beams coming upward to patient. These sheets of lead are, of course, quite heavy and they "stay put" without any difficulty after we have made the set-up for that treatment. Figure 3 shows this same male patient (again you will note the four thicknesses of lead rubber between pillow and patient's head) so placed that he is receiving the upward beam of x-ray through only the malignant breast chest wall and shoulder. Please note, however, that the x-ray in this position is being delivered to these areas from the opposite direction as that shown in Figure 2; in such cases, it is necessary to move the tube in the treatment couch below patient upward sufficiently to maintain the proper target skin distance. In this particular case, the records show that we had to move our tube upward 14 cm. for the treatments given in this position.

Figure 4 shows the patient placed in proper position for the x-ray to be given directly through the chest from an anterior port of entry.

In giving these doses of x-ray, we sometimes need to use especial care and ingenuity to properly throw the x-ray through certain desired portals of entry and in certain desired directions. Figure 6 illustrates one way in which we may throw x-ray through the shoulder, supra and infraclavicular regions, breast, etc. Of course, in the set-up illustrated by Figure 6, the lungs would also receive irradiation.

In all cases, we include the shoulder and clavicular areas on the affected side, and one-fifth, or 1000 "r" are sent directly through the entire chest, 500 "r" through the anterior wall of chest with central beam of x-ray aimed directly at the fourth or fifth dorsal vertebra, according to the "build" of the patient, and keeping the doses just within the limit of the patient's tolerance, so as to avoid severe nausea or other severe shock to the patient's vitality, and 500 "r" with patient as shown in Fig. 6. We give a dose of x-ray either every second or every third day, depending upon the age and strength of the patient, until we secure a "saturation limit" of the entire area after the method of George Pfahler, and then give the rest of this first series of doses just large enough to maintain the saturation limit of the tissues until

at least 5000 "r" (we usually give 6000 to 8000 "r") of the first series of x-ray treatments have been given. We thus give more than an ordinary erythema dose through each portal of skin entry, and several times an ordinary erythema dose through the malignant area. By using four portals of entry, we can thus deliver

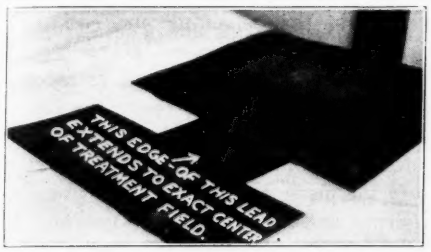

Fig. 5. Sheets of lead 20 in. long, from 12 to 18 in. wide, and ¼ of an in. thick, are placed under the patient, as indicated, to limit size of field and also the lateral deviation of x-rays going to patient.

at least 5000 "r" to the patient during this first series of x-ray treatments.

The "Thoraeus" filter, as you know, is a combination of tin, copper and aluminum, and, in my opinion, gives us a better depth dose, and in less time than one would obtain using an equivalent amount of copper filtration. In my paper read in 1931, I predicted that "A still better filter may some day be developed," not knowing that Robert Thoraeus of Stockholm, Sweden, was at that time making a most careful and scientific study of the whole matter of filters. Thoraeus worked out and gave to the medical profession of the world his valuable filter, which we gratefully designate by his name. Doctors Quimby and Failla of The Memorial Hospital of New York City made a series of rigid scientific tests of Thoraeus' filter and found that all of Thoraeus' work and his published reports were correct. At the request of a number of Radiologists, Dr. Robert S. Landauer of Highland Park, Ill., procured the materials and personally supervised the manufacture of these filters for our use here in America. Before using the "Thoraeus" filter, we used for the most part 2 mm. Cu plus 1 mm. Al filters. The higher voltages than 200 KV may be better for the treatment of these cases, but this is an open question that has not yet been settled. In so far as I known, the majority of radiologists, physicists, and pathologists today are inclined to the belief that 200 KV is as useful as a higher voltage. These x-ray treatments are the *first thing* to be done for the patient, and occupy from three to four week's time in the treatment.

2. Any hard and well developed masses that remain after this preliminary series of x-ray treatment should *at once* by treated by the interstitial placing of radium within these malignant masses in platinum containers of at least one-half mm. wall thickness, and 1.5 mgms. (or about that amount) of radium in each implant, and enough radium should be placed and as evenly distributed as possible so that we may have one mgm. for each cubic cm. of the malignant mass. All radium should be placed at least one cm. beneath the skin surface and no radium should be placed closer than one cm. to any large blood vessel nor to any healthy bone surface. We leave this radium so placed in position for at least one week, which is a longer period than most radium therapists use. However, in certain bad cases of large, hard scirrhous

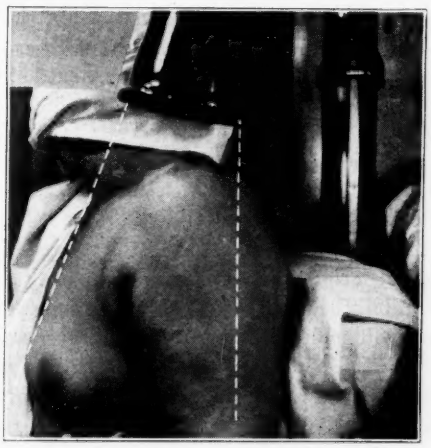

Fig. 6. By heavy lead shields to limit port of entry to side and base of neck and top of shoulder, we can thoroughly ray these areas, including the axilla, without any direct rays hitting the skin in front and back of chest wall.

masses, we leave the radium in the tissues for as long as ten days.

3. In all cases where there were well developed carcinoma tumor masses, the remaining tissue of these masses, together with an adjacent margin of 2 cm. of healthy tissue, should be excised surgically *within forty-eight hours after the radium therapy is completed.*

4. The complete removal of the breast and

axillary lymph nodes is not necessary, and not desirable in the cases thus treated.

Now, some other important considerations:

During all of these x-ray treatments we insist that a competent and experienced internist who will fully cooperate with us by making the required blood examinations, heart studies and urinalyses at the proper times and who will faithfully look after the patient's diet and general health conditions, be constantly in charge of this patient. We further insist that this internist "follow through" on this case during all necessary subsequent care of this patient whether it be radiotherapeutic or surgical.

In our opinion the radiologist and the surgeon are, and should be, directly and solely responsible for the elimination of the malignant disease of the patient while the internist is, and should be responsible for the patient's general health through the entire time of the patient's care. This "Internist" should, if possible, be the "regular family physician" who is familiar with the patient's habits, history, idiosyncrasies, etc. Such a physician, if he is honest and capable, should be *The Physician* to give the constant cheer and encouragement to the patient throughout her entire ordeals of treatments and "the fight for life" that the patient must necessarily make in all such cases.

Upon this physican's tact, ability and complete honesty much depends. Fortunate indeed is the patient who can secure the services of a Medical Triumvirate that will completely meet and fulfill the above ideals. If all of these physicians will meet and consult, *In the Presence of the Patient,* and *Then* and *There* plan the basic details of the treatments, operation and care of that patient for a period of the next five years, or longer, the outcome will, if the case has been diagnosed early, be successful in at least 80% of these cases.

It is our opinion that all normalminded patients who have a breast cancer should be honestly and frankly informed of the fact and that said patient should, as above stated, be present and be an active partner in the conference of the radiologist, the surgeons and the internist or general physican *before* the treatment and care of the case is begun. This broad-minded start of the care of the patient will do wonders to remove the tendency of some physicians to "pass the buck" during the treatment of the case, because, in this preliminary conference, it should be definitely outlined, agreed upon and fully understood by all four of the people interested, exactly what duties rest upon each of these four people primarily involved in the plan and just what each one is to do and precisely when these various things are to be done.

In our private practice, we have been 100% successful in thus planning and carrying out the treatment of these cases because we *Insist* upon the full preliminary plans, as above outlined, *Before* we start to care for the case. Of course, an occasional illness or disability of some physician may make it imperative to slightly modify the plans, but the *Complete* preliminary conference and plans, with the full and frank understanding as above outlined, makes the whole care of the case comparatively easy, pleasant and in at least 80% of the cases, successful.

We have attained a percentage of 81% of five years or more freedom from malignancy in all of the cases thus treated in which there were no pulmonary, spinal nor other gross evidence of metastases in these or other internal organs, and where there were no palpable lymph nodes in the supraclavicular spaces before the treatments were started.

It will be noted that one of the underlying principles of our plan of treatment is the immediate follow-up of each definite part of the treatment with the next planned step of treatment. Our purpose in doing this is to try to catch all of the malignant cells with some form of radiotherapy during their most radio-sensitive stage of development. Then, if we have not succeeded in permanently destroying the vitality of the more well developed malignant centers, we try to eliminate these by the *immediate* followup of surgery, as above outlined. Contrary to many expressed surgical opinions, our experience is that if the surgical work be done immediately following the radiotherapy, we get a prompt healing of the surgical wounds. However, we find that these healed wounds are somewhat slow in forming the necessary fibrous tissue union of the tissues and that the retaining sutures have to be left in place some two or three days longer than would ordinarily be done with an ordinary surgical wound of the same type where no radiation therapy has been used.

Where recurring malignancy follows the above outlined treatments, if these recurrences show

up as superficial nodules, we immediately implant through or just beneath each such nodule the same type of radium removable implants as were used in the original treatment of the case, but we double the amount of radium; that is, we use 2 mgms. of radium for each cu. cm. of the nodule tissue, and, unless there is a large blood vessel, nerve trunk, or healthy bone closer than 2 cm. from the nodule thus treated, these radium implants are left in place seven days in the usual case. If the patient is fairly young and in robust health, we give these recurring cases a second series of x-ray dosage at the same time that we are using the radium implants in any nodules that may have recurred. If there are recurrences in the internal organs, as may be shown by a pulmonary or other internal metastases or bone destruction of some of the vertebrae, we then refrain from doing anything more in the case other than the giving of such paliative x-ray treatment as may tend to relieve the pain or other distressing symptoms that the patient may have. The comparative rarity of these distressing recurrences makes the whole picture a much more bright and encouraging one than it was possible to produce in the days before irradiation therapy began to materially brighten up the outlook for these cancer patients.

636 Church Street.

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DISCUSSION

Dr. B. C. Cushway, Chicago: This has been a very interesting presentation. Dr. Perry has made use of practically all the methods of treating malignancy. I will confine my discussion to general points rather than the technical procedure, because Dr. Cutler is with us, and I should like to have him have some of my time. He has had more experience than I have had and than perhaps most of us. I personally would be interested in what Dr. Cutler might say.

I think Dr. Perry should be complimented on this presentation. Work of this kind is certainly valuable to us as radiologists because it stimulates us to go farther in treatment of this sort.

There is one thing that is very striking in the presentation made by Dr. Perry, and that is the thoroughness and particular attention shown to details. Certainly, if we are to make any progress in this field, that is one essential we must have, thoroughness in detail.

The advantages or perhaps improvements in our radiation technique are very largely due, as I see it, to the use of increased filtration, to the possibility of carrying the radiation dose to the fullest extent, even that producing destruction of tissue, feeling that if tissue is destroyed, later on this may be repaird by surgery.

The great obstacle to success in this work is, perhaps, the fact that we will fail in many cases due to the fact that we cannot get them early enough to carry out the treatment successfully.

We have heard a great deal about surgical judgment in connection with surgery. I think we should coin some expression in our radiological work that would have some similarity, because certainly the radiologist needs a high degree of judgment. Radiological judgment, of course, can only be acquired in the same manner that the surgeon acquired his surgical judgment, with a knowledge of anatomy, a knowledge of pathology, of pathological surgery, and then the experience that comes from treating a great many of these cases.

In treating these cases, it would be only proper to mention that we should divide them into cases that are curable, radiation-curable cases, and radiation-palliative cases. Of course, radiation-palliative cases would not have the treatment that Dr. Perry has just outlined for us.

As to the application of this plan of treatment, as to whether surgery should be used, or radiation be emphasized more, I think that will still have to be proved. I think that is a matter that is experimental at this time. We must, of course, consider the use of electrosurgery and the plain surgical excision. We know that with plain surgical excision in malignancy of the breast some very good results are being obtained or have been obtained. Whether we can do better with our radiological methods remains to be proven.

It seems to me that the ideal method would be the use of preoperative radiation followed by electrosurgical excision with the use of radium where and when indicated, as a supplementary measure, and followed by postoperative radiation in most of these cases.

Dr. Henry W. Grote, Bloomington, Ill.: In the main I agree with this, but I do not believe in so much traumatism, excepting in recurrent cases. We as radiologists see a lot of these cases come in postoperatively with really extensive and vicious recurrences. In those cases I agree with implantation.

I have a lot of notes and questions, but I am going to give up the rest of my time to Dr. Cutler.

Dr. Max Cutler, Chicago: I was very much interested to see the film of Dr. Perry and compliment him on his industry in accomplishing this difficult task. However, I cannot subscribe entirely to the technic which he employs.

In my opinion the essential defect in the method is the shortness of the needles. This requires the use of many more needles and therefore additional trauma which should be avoided under different circumstances. The theory that increased bleeding is of assistance to the patient is surgically unsound and I would emphasize that as in all surgical procedures, hemostasis should be as complete as possible. I must also take exception to the suggestion that the surgical procedure for cancer of the breast should not be entirely radical. There has been, I think, an unfortunate tendency to diminish the

extent of the surgical procedure for mammary cancer but on the hope and confidence that postoperative radiation will destroy the remnants of the disease. This is a very unsound attitude, and I am sure it is bound to reduce our five-year cures which radical surgical efforts have attained. When the surgical operation is performed for cancer of the breast it should be the radical operation as described by Halstead. Surgical procedure for mammary cancer which does not fulfill these principles does not offer the patient her greatest chance of cure.

At the present time most authorities are of the opinion that surgery combined with radiation offers the better prognosis than either surgery or radiation alone. To this view I subscribe. Under some circumstances I use pre-operative radiation, perform the radical operation, and follow this with postoperative radiation. In most instances I perform the radical operation and only followed but not preceded by radiation.

The use of radiation alone in the treatment of operable carcinoma of the breast constitutes an interesting field of clinical research. There is no question that the cure of cancer of the breast can be accomplished by radiation. Whether it can be accomplished with equal frequency as by the radical operation we are not yet in a position to state. Until such time as adequate evidence is available to demonstrate the superiority of radiation alone over surgery, the treatment of operable mammary cancer should consist of the radical surgical operation, sometimes preceded by or followed by radiation therapy.

Dr. Gentz Perry, Evanston, Ill.: In connection with the movie film shown I just want to state a few things. One is that in the preliminary x-ray therapy I followed the Pfahler method. The patient was given 4652 "r" before the radium was used. That treatment extended over a period of four weeks. That x-ray treatment was immediately followed by the radium treatment, which was all given through one-half mm of platinum filtration, in the manner outlined in this paper, and consisted of a total dose of 19,337 milligram-hours. Only the mammary gland, and none of the muscle nor lymphatic tissues of the chest wall nor axilla, was later removed surgically.

At the beginning of the x-ray treatment June 8, 1931, patient weighed 158 lbs., and after all of the irradiation and surgical treatments had been finished she weighed 136 lbs. Weekly studies of her blood and of her entire physical conditions were made over a period of six months and she was given careful supportive diet and medication during all of this time. She now weighs 154 lbs. and is apparently in perfect health and x-ray stereoscopic films show that both lungs are entirely clear and there is no sign of any pulmonary fibrosis. She is physically and mentally unusually active for a woman of her age.

As you will recall from the film shown, the original cancer mass had completely inverted the left nipple and, before treatment was begun, this mass measured 10x12 cm in size and stood up above the normal level of the surrounding surface of skin fully 5 cm. This mass had shrunken to less than half of that size after the irradiation therapy was completed.

Three competent pathologists made the microscopical studies of the preliminary biopsy and of the tissue removed surgically and we are especially grateful to Professor Doctor James Ewing of New York City who so kindly made a thorough microscopical study of these same tissues.

WHY IS AN ANTIVIVISECTIONIST?

C. I. Reed, Ph. D.
CHICAGO

After more than twenty years of contact with, and active participation in what certain people choose to call vivisection, I am still at a loss for an answer to that question. I first engaged in animal experimentation because I needed to have certain information relative to the care of dogs and all efforts to obtain it by any other method failed completely, although I tried strenuously and sincerely to get it in some other way. Until that time I had never had any contact with a militant antivivisectionist. I was, therefore, greatly shocked and puzzled when an intelligent, well educated lady informed me that I was an inhuman brute, worthy only of contempt and of the severest punishment possible. There was absolutely no financial gain to me in the experiments which had drawn her disfavor. The experiments involved no surgical procedure, the dogs never gave any evidence of discomfort, and when the experiment, a simple feeding experiment, had terminated they were all three given to friends. And yet my accuser insisted that I was a vivisectionist.

The term vivisection means literally "cutting up alive." To most opponents of the experimental use of animals and perhaps also to the uninformed public, it implies cutting without anesthetics.

Through the intervening years, I have devoted a great deal of thought to the problem of understanding the psychology of the "anti." It has always been my practice when differing with another on any subject to first make an honest effort to see the problem through the eyes of "the other fellow" and thus determine whether I really am in the wrong. I have made an honest effort to do this in relation to the antivivisectionist.

I have talked with many active members of

Department of Physiology, College of Medicine, University of Illinois.

this group, discussing the problems involved and trying to understand. I have examined the work, the motives and the accomplishments of my colleagues in a real effort to decide whether the charges so frequently made against them are well founded.

I have many friends who are members of some one of the "anti" groups. They are often intelligent (at least on other subjects), refined, well educated people. We discuss the problem frankly and without mincing matters. We differ but respect each other's views. I have, in the study of this question, acquired a rather wide acquaintance with groups of antivivisectionists. To my surprise I have found that they are not a homogeneous group but rather embody many divergent types of humanity.

The first agitators on the question in this country were apparently well-meaning humanitarians, poorly informed but very sincere, who were aroused to militant frenzy by the experiments of John Call Dalton, who later became president of Columbia University. He had found it desirable, as a teacher of physiology, to use anesthetized animals in demonstrations before his classes. In those days anesthesia was poorly understood and it is comprehensible that laymen failed to appreciate how an animal could "react" and still be unconscious.

A little later Henry Pickering Bowditch, first full time professor of physiology at Harvard University, became the center of attack. The motivation of the attackers appears to have been much the same as in the case of Dalton.

In those days there were no Christian Scientists and no strongly "antimedical" groups in this country. But with the development of the numerous healing cults a new type of individual came into the picture, one opposed to animal experiments from purely selfish motives because the practice was largely carried on by medical men and, therefore, at variance with some particular antimedical organization. In the case of the cultist, there is a noisy, pestiferous annoyance but no very effective opposition.

From my own personal contact with intelligent and cultured Christian Scientists, I do not find that many of them are strongly opposed to animal experiments per se but only insofar as the practice is a part of modern medicine. There are, of course, exceptions where the Christian Scientist is also an illogical, emotional sentimentalist.

While the opposition to animal experiments has been annoying and troublesome, no very substantial effects were accomplished until all of the various elements were welded together under the leadership of professional promotors and agitators who have no particular moral or ethical scruples about the practice, but whose living depends on the enlistment of the active interest of progressively larger memberships in the organized groups.

With the Christian Scientist, I am not disposed, at present, to debate. He is entitled to his religious views and any attack upon him will be interpreted as an attack on his religious liberty. With the other antimedical cultists and health faddists it is futile to argue. If they are so unreasonably partisan as to be unconvinced of the accomplishments of scientific medicine in the face of the mass of evidence available to anyone who will examine it, they stand little chance of really understanding any further evidence that one may present. They are not necessarily ignorant, just prejudiced. Despite the claims of the antivivisectionist organizations, I am inclined to the view that these people make up an uninfluential minority.

The sentimental humanitarian, on the other hand, is usually actuated by motives of the finest order even though his efforts are grossly misapplied. He may be ignorant, he may be partisan, he may be misinformed, but he is usually far less vicious, far less menacing than the paid organizer and executive who must make the movement succeed or lose his job; less ludicrous than the publicity seeker who uses any and every opportunity, regardless of ethics, to gain sensational publicity either to gratify the ego or to gain professional advancement by such means.

One prominent "anti" is a vegetarian who says he would not take a dose of insulin even if he knew he would die without it, because it is a product of animal experiments. He argues that man has no ethical right to profit by the pain or death of a lower animal. At first, one is inclined to pay the highest tribute to his stand —until it is noted that he wears leather shoes; has a fur collar on his overcoat; carries a knife with a genuine stag horn hande; goes fishing for sport; wears woolen clothing; and has a fur rug in his home. All of these are available to him

because of the death of some animal, except woolen clothing. This will be referred to again.

The antivivisectionist attempts to justify opposition to animal experiments on the basis of certain reasoning, the premises of which are as follows:

1. Man has no right to profit by the suffering, death or restriction of liberty of lower animals.

2. Animal experiments have contributed no useful knowledge whatever.

3. Animal experiments invariably involve cruel treatment of the subjects.

4. The experimenter is an inhuman brute, a sadist, who takes this method of gratifying his lust.

5. Animal experiments are carried on by irresponsible enthusiasts actuated by selfish motives.

6. The experimenter depends for his subjects on the theft of the property of others.

7. Certain diseases have been increasing in spite of medical research; therefore, it does no good to carry it on.

As a matter of fact, the real reason does not depend on any of these points. I first obtained a clue to this in correspondence with a prominent female antivivisectionist. I challenged her to explain her stand and also challenged her to come unannounced into our laboratories and stay as long as she wished in order to see just what was being done and thus become better informed on a subject about which she had been, and still is, a profuse writer and speaker. Her reply, quoted in part below, gives a clear notion of the real animus of the "anti."

"The reason I did not visit your laboratories was that I knew I should only see there the sort of care you give your dogs—and it is not their daily care (which we who cannot bring ourselves to embrace vivisection) (SIC!) that concerns us chiefly. My husband urged me not to go as he knew I should be unhappy about it for days, and there are far too many distressing cruelties brought to my notice every day, for me to add one more burden. * * *

"I did see, years ago, when living in ———— (a university city), a dog that had been operated on, still strapped to the table at ———— University. I stumbled into the room by accident, looking for someone, and it was a sight I have never been able to forget."

These paragraphs reveal clearly the purely emotional motivation of her reaction. She does not state what kind of an operation had been done, what was the animal's condition, whether dead or alive, she obviously made no effort to determine whether the animal was even alive when operated upon. In some laboratories, dead dogs are dissected—also used as dummy subjects for surgical operative experience. In short, she merely acquired a bad attack of "horrors" without attempting to learn anything of the conditions of her observation.

She sidestepped rather clumsily the matter of visiting the laboratories. One wonders just what would be her reaction if she should visit one of our great clinics and see the poor broken wrecks of humanity, waiting in dumb resignation for relief from suffering, relief which the physicians are not able to give in many cases because medical science has not yet given to them enough of the necessary knowledge to deal successfully with these cases.

One may trace a similar motivation in the perverted views of most of the emotional antivivisectionists. Their only justification lies in this emotional reaction. When they attempt a logical grounding in the seven premises stated above, the scientist can readily marshal arguments that will convince the unbiased mind rather readily. In case of the mind already closed to reason by blind prejudice he has little chance of carrying conviction. In that case he must appeal his case to public decision, for after all, the public is the sufferer from lack of knowledge and the beneficiary of knowledge gained.

I can comprehend a certain degree of emotional attachment for a dog. Not for any and every dog, but for certain ones. My only playmate as a child was a dog. My small boy has a beautiful but perfectly useless, flighty female collie to which he is greatly attached. She is a heavy expense and a constant modifying factor in our activities. Because the youngster likes to play with her, we are satisfied to keep her. If anyone were to abuse her, I fear I should display considerable emotion about the matter. I think, therefore, that I am able to comprehend fully the emotions of dog lovers.

But in a great hospital lies a little girl of 13 years, an intelligent, lovable little tyke, who is, in my estimation, the world's greatest optimist. For three years she has lain in a hopeless condition of fixation of nearly every joint in her body including the jaws. Every movement, even contact with clothing, was an extremely agonizing

experience. For three years before she came into the hospital she was unable to play and enjoy a normal child existence. Nothing could be done to arrest the progress of her condition, because, in spite of the most strenuous efforts on the part of the men who tried to deal with her case, they were handicapped by lack of the necessary knowledge.

Lucile is sure she is going to get well. She has only two replies when asked how she is, "Fine," and "All right." Her sweet smile and cheerful gratitude for any favor would melt a stone. Can her faith be justified? Are her attendants going to be compelled to break faith with her?

If the antivivisectionists have their way, yes, she will be left to her fate. Why? Because the only treatment that has so far shown any prospects of benefitting her was derived from some investigations that resulted in the death of 40 dogs. The only prospect of further benefit lies in further pursuit of the problem by more animal experiments. One of her attendants has said, "I would be willing to kill all the dogs in the city of Chicago, if I thought I could thereby gain enough knowledge to make this little girl walk again and thereby justify her faith in me and my colleagues."

So, kind reader, you may take your choice of two courses. You can see the dogs pampered and petted while Lucile and thousands like her continue to suffer, while the dog lovers tie the hands and fetter the brains of the men who would help them. Or, you may decide to give the investigator liberty to go ahead and try to gain more knowledge that will be of value to you and your descendants.

The acquisition of knowledge is a slow process. Knowledge does not come alone from thinking and observing, however valuable these may be. There are always circumstances in which these processes will not bring the answer and then must one resort to experiment.

A few years ago the local "anti" group published a booket made up of questions and answers. One of the questions was:

"How can they (surgeons) learn entirely new operations?"

Ans. "By observation, careful thought, and some degree of genius * * *."

The observational method which depended on chance and was, therefore, largely empirical, was the method of choice in medicine until about one hundred years ago. And one has no hesitancy about admitting that the method did add greatly to knowledge. The medical scientists have never denied it. In fact, a large part of the medical knowledge now available has been gathered without the aid of animal experiments, certainly without those involving surgical operations and death of the animals. But, unfortunately, there are vast gaps in knowledge that cannot be filled in this way. When the natural limitations of this method are reached then man's eyes, ears, nose, tactile sense and reasoning power must be augmented by experimental procedures.

Medical history is full of examples of mistakes made because the physician relied too much on reasoning from insufficient data. For example, Billroth, one of the most able European surgeons of the past century, once declared that no surgeon who wished to preserve the respect of his colleagues would even attempt to operate on the heart. But in 1881 Dr. John B. Roberts boldly proposed experimental efforts on animals and thereby initiated a series of investigations by several surgeons from which, finally, was developed the technic by which many hundreds of such operations have since been performed on the human heart and many lives saved. Without animal experiments this would have been impossible.

Prior to 1900 it was practically impossible to satisfactorily diagnose many of the symptoms resulting from head injuries because, in spite of innumerable observations on human subjects both at operation and at autopsy, the localization of function in the brain was not understood. This knowledge was not gained except by animal experiments. Since that time the surgeon can proceed to operations for correction of head injuries with much greater assurance of success. Some of this information might have been acquired in the course of centuries but much of it never could have been gained in any way other than by experiments on animals.

One might give detailed accounts of hundreds of such instances in which valuable knowledge has been acquired by experiments on animals. But these few examples should serve to refute in the open mind the claim that animal experiments have not brought any useful information to us.

Let us now consider the premises upon which the antivivisectionist attempts to build up a

logical argument to justify or to camouflage or to excuse his own emotional instability. The first proposition is that man has no right to profit by the exploitation of lower animals. Every law-making body has recognized a certain limitation on such use. We have laws prohibiting the killing or caging of certain birds, such as the cardinal, although it is legitimate to imprison for life the canary and parakeet. The fact that they may have been reared in captivity does not alter the fact that they are living in an unnatural environment.

Very few antivivisectionists are also vegetarians; they are wholly unaffected by the killing of thousands of cattle, hogs and sheep for food. Many of them would consider it a hardship to dispense with furs derived from animals. Under primitive conditions furs and wool were necessary for the continued existence of man; but no one can logically argue that either class of clothing is indispensable under modern conditions.

We consider the confinement of animals in a zoological garden as an educational procedure; but just how do we acquire the ethical justification for so doing?

Until man learned by experiment how to grow cattle without horns, it was a custom to "dehorn" them by a variety of methods, none of which can be classed as painless. Every stock breeder performs the process of emasculation without the use of anesthetics, although the shock from pain is often so great that I have seen such animals lie in a state of collapse for hours.

Sportsmen slaughter game birds and animals by the thousands every year without the slightest concern for the suffering that may result from their enjoyment. I have yet to hear or know of an antivivisectionist voicing any strong protest against this practice.

Now, if we want to be strictly logical, just what right has man to own a dog at all, or to restrict him to a kennel? The possession may bring pleasure and occasionally some practical benefit. But, for the most part, man's domination of the canine species has only made of him a parasite, perfectly content to feed on man's bounty.

So-called renegade dogs in the wild state are probably much happier than their domesticated siblings, and are extraordinarily self-reliant in their own welfare. That they lose much of this in domesticity is apparent from the ease with which most of them become lost and bewildered when removed from their accustomed habitat. It can scarcely be argued then that man has conferred any great benefit on the dog by assuming ownership.

The extreme but not illogical culmination of this line of reasoning would mean the discontinuance of the eating and wearing of all animal products; turning loose all animals in the zoo, and in the pet shop; disposing of draught and riding horses and other work animals.

Of course, this catastrophe will never result because the antivivisectionists are not logical in their reasoning. Even if they were, the common sense of the average citizen would assert itself, for everyone realizes fully that the human race could never have attained to its present degree of advancement, probably could not have survived, without the utilization of benefits to be derived by using and even killing animals.

The second point has been partially answered already. It would require a book to even list all the benefits that have come from animal experiments. Either the "antis" who make this claim are ridiculously ignorant or wilfully dishonest. The author will be glad to furnish further detailed evidence on this point to interested readers.

The claim that all animal experiments are cruel is likewise evidence of ignorance or dishonesty. Of course, opinions differ as to what constitutes cruelty. The legal definition is based, not on the actual procedure to which the animal is subjected, but on the practical necessity involved. In the strictest sense it is cruel to kill meat animals. It might also be considered cruel to draw blood from a dog's veins.

That many animals, dogs included, do experience pain in survival experiments is freely admitted. That such pain is ever inflicted except in the sincere belief that the knowledge to be gained is indispensable, directly or indirectly to human welfare, is flatly denied. Probably not more than 10 per cent. of the dogs used for experimental purposes are subjected to survival experiments. The others are always dispatched under anesthesia.

One can scarcely claim that the methods of killing stray, unclaimed dogs in the dog pound are exactly devoid of suffering. In the Chicago pound, for example, the method officially ap-

proved by the Humane Society and other similar groups is to enclose a large group of dogs in a tight building into which gas is directed. Anyone who has witnessed this procedure can scarcely argue that anesthetization is more cruel. It sometimes requires a considerable period of this treatment before all of the dogs are pronounced dead. Cruelty thus becomes a relative matter.

There are definite physiological criteria by which the degree of pain experienced by man or animal may be judged. Many careful observations indicate clearly that the dog is much less sensitive to pain than man. I have seen untrained dogs lie unconfined on an operating table without flinching while blood was drawn from the veins or even from the heart. The physiological signs do not give any evidence of painful reactions. Sometimes a frightened dog in strange environment will howl, or fight, before being subjected to any sort of manipulation. This, however, cannot be designated as pain.

The fourth premise, that experimenters are actuated by sadistic inclinations, likewise reveals the ignorance of the accusers. After many years of personal acquaintance with a rather large group of experimenters who, I believe, are fairly representative of the whole group, I can truthfully say that I know of only one man who ever gave evidence of *gloating* over his work. Fortunately, he is no longer active in the field. I have heard of one other man, who was severely criticized by the 10th International Physiological Congress in Paris for experiments in which, the most liberal investigators agreed, he inflicted unnecessary suffering. For myself, I have never succeeded in conquering a feeling of nausea whenever it becomes necessary to perform an experiment on an animal. Consequently, I naturally exhaust every effort to find another way of learning what I need to know. And it is always with regret that I finally resort to such an experiment.

I saw one student in my class who seemed to display an unnecessarily cold-blooded attitude toward the experiments he was asked to perform on animals. I confess to a certain feeling of repugnance toward him until I discovered him just after a laboratory period had closed in an anteroom very ill. Upon questioning him I learned that this was an invariable sequel of a laboratory period in which animals were used.

I offered to excuse him from further participation in such experiments. He refused, saying, "No, I am studying medicine primarily so that I may try to cure my sister who is now a hopeless invalid. I am going to need all the information I can get."

A sadist? If so, may Providence send us more of his kind!

Passing over for the moment the fifth and sixth premises, let us consider the seventh. That certain diseases have increased under conditions of modern civilization cannot be denied. Diabetes is cited as one of these. The arguments of the "anti" are somewhat as follows: Insulin is one of the modern triumphs of animal experiment. Therefore, diabetes should decrease if insulin is any good. Since the incidence of diabetes has increased, the forty years of research that culminated in the discovery are wasted. Again we have a masterpiece of reasoning based on pure ignorance!

Diabetes is increasing because it is a disease, one of the etiological factors of which is nervous stress. Modern conditions have subjected the human race to greater stress, hence, the increased morbidity rate. Insulin was never claimed to be either a preventive or a cure. It is only one of several methods of control, the most efficient one, in fact, for the advanced stages of the disease.

The list of other diseases that we can now control through knowledge gained by experiments on animals is too long to include here. Specific evidence will be furnished to the reader who desires it. That other diseases have not yet been conquered means only that not enough experimental investigation has been done. Doesn't it seem rather peculiar reasoning to insist that such efforts should cease merely because these efforts have not yet been crowned by success.

When you desire expert advice about your automobile you go to an automobile mechanic and you usually take his advice without demurrer. If you want legal advice you consult an attorney and thereby concede that he knows more about it than you do. If you want to build a house, regardless of what your ideas may be, you concede to the architect a greater amount of technical knowledge than you have. In short, the man who devotes most time to a subject usually knows more about it than you do. Sometimes your judgment may prove to be

better than that of the expert whom you consult. But the chances are against you by large odds.

Yet here we find a group of people who have generally had no technical knowledge of the subject on which they presume to pass judgment; most of whom have never been in a laboratory; who, as a group, are not now and never have contributed anything to human welfare and happiness; whose principal weapons are villification and distortion of fact, setting themselves up as judges of a highly technical procedure that happens to disturb their over-delicate sensibilities.

On the other hand, we find a group of men and women, distinguished for individuality of thought, who have devoted years to preliminary study and training; people of intelligence and integrity in other phases of contact with society; actuated by motives of highest humanitarianism; most of whom could have earned several times their present incomes in other activities; some of them even working without compensation; making available to everyone, without restraint, such knowledge as they derive. These are the people whom the "anti" condemns as brutes, sadists, profiteers and fools! Dear reader, learn to know these men, then make your choice.

Returning to the fifth premise that animal experiments are done by irresponsible enthusiasts, I am sure that anyone who follows the long period of training which every investigator must undergo before he is permitted to use the facilities of a university laboratory for animal experiments, will concede that the novitiate can scarcely be irresponsible. There are instances where untrained and irresponsible persons have undertaken experiments outside of the laboratories. Such practices are frowned upon by the recognized investigators quite as darkly as by the "anti". The counterpart of the bootlegger exists in every profession. We have men who make counterfeit money. Should we dismantle the United States mint because of them? This would be quite as logical as to stop all investigative effort because an occasional student or other scientific putterer does experiments solely to satisfy a curiosity that is not constructive.

The sixth premise is in some respects the most important at the present moment because upon it is based one of the most serious attacks the "antis" have ever made on animal experimentation in this country. It is claimed that investigators depend on the theft of animals that are the private property of others. This charge is confined to the use of cats and dogs since all other animals are purchased through regular dealers who raise them for this purpose. Long ago all institutions in which such work is done took definite steps to prevent the illegal use of animals. So far as personal experience and observation go I know of no instance of the use of cats except those purchased from legal owners who no longer desired to keep them and did not want to go to the trouble of disposing of them. Usually, such cats, unless sold, are allowed to drift away and become pitiful derelicts, living on bits of garbage or offal of the streets and alleys, drifting in fear and terror until killed by roving dogs or street urchins, or dying in misery from starvation or some one of the diseases which invariably overtake them if they are allowed to live long enough. In the latter case they become a serious health menace in any city, not only to human beings but to others of their kind and to dogs. Is it not better that they contribute something to knowledge than to eke out a miserable existence in the streets and alleys of the slums?

In case of dogs, research institutions have imposed stringent regulations as to the source of supply which an investigator may use. Pet dogs have been stolen in the past by a few unscrupulous investigators who have ultimately been eliminated from the institutions in which the work was done.

Because I once inadvertently allowed a student to bring into my laboratory a dog which he represented to me as legal property, both the student and I were required by the head of the department to pay $25.00 each to the original owner. If one were inclined to be unscrupulous, not more than one such experience would be ample to convert an overambitious embryo investigator to a different point of view.

Every city of any size operates a dog pound to which stray dogs or unlicensed dogs are brought and kept for a legally specified time in case owners wish to reclaim them. If not claimed, they are then killed in some manner usually specified by the local humane society.

The practice of research institutions with regard to impounded dogs varies in different cities. In Chicago, for many years the research institutions have secured dogs from the pound, *only after they had been held until the pound*

master was satisfied that they would not be reclaimed.

No fee was paid for these dogs, as it was considered an economical method of disposing of them. They were delivered by order of the Commissioner of Health under authority from the Mayor, who was empowered by ordinance to dispose of them after the legal time limit had expired. The records of such deliveries are on file for a period of over fifteen years. They have not, therefore, been "bootlegged", as claimed by the "antis".

This practice proceeded in a regular manner, and there was little difficulty along this line until the Illinois Antivivisection Society secured the services of an able and efficient publicity expert as its executive secretary. It has been stated that his salary was paid by a prominent actor. He promptly instituted a vigorous campaign for increased membership and began the extension of organizations throughout the country. The Society, in the late fall of 1928, began laying plans for a vigorous campaign to secure the passage of a bill by the State Legislature which would impose a heavy penalty for the use of *any sub-human animal form* for experimental purposes. This bill failed of passage.

Two years later another less drastic bill was introduced and again failed of passage. After the hearing on this bill in Springfield, Mrs. Charlotte Hunt, then President of the Chicago Humane Education Society, stated, in effect, to the writer and to Dr. A. B. Luckhardt, "Very well, if we can't beat you in Springfield we will take the dog pound from you." This is not a verbatim quotation, but the sense of her declaration was as stated.

In the summer of 1931 this threat was carried into effect by the passage of an ordinance prohibiting the disposition of impounded dogs to the research institutions. Through the efforts of the Illinois Society for the Protection of Medical Research, this ordinance was subsequently replaced by another ordinance restoring the previous privilege of securing dogs from the pound for experimental purposes.

Since that time, the various organizations composed of the emotional humanitarians have kept up a continual battle, either through the court, in an effort to have the city enjoined from exercising the legal right of the chief executive to dispose of the dogs in the pound as he sees fit, or through vitriolic attacks through the newspapers on the experimental laboratories and institutions, in which many unsubstantiated claims are made.

There now exists ample legal provision for the punishment of individuals for cruelty to animals. If the claims of these antivivisectionists are true, why then do they not resort to the legal provisions now available? Instead of attempting to prosecute individuals by means of the laws now available, they confine their activities entirely to agitation for new laws. It is quite obvious to any one who will review the facts dispassionately that both the claims of cruelty and the claims of mismanagement of the dog pound with relation to the disposition of pound dogs, are poorly camouflaged efforts on the part of these emotionally unstable individuals to impose restriction on scientific research solely because they themselves do not like it.

Another device used by the antivivisectionist reveals clearly the unfair attitude of these people. On their letterhead appears a list of prominent individuals who are opposed to animal experimentation. Among these are several individuals who have been dead for many years and who cannot, therefore, have viewed the practice in the light of modern development. There are others with whom the writer has communicated personally, and who have, in a very definite manner, repudiated all allegiance to the antivivisection movement.

I have on my desk, at the moment, a letter from a prominent Chicago attorney whose name appears in this list, in which he repudiates all responsibility for his name having been included therein. As stated before, this is an unimportant point, but it reveals the workings of the antivivisectionist's mind. If the antivivisectionist was willing to confine his activities and statements to facts, one might have more sympathy with him and be more willing to concede to him, at least a misguided, emotional motive; but when he deliberately distorts facts and misuses statements from disinterested parties in furtherance of his campaign, then we must conclude that the motive is an entirely selfish one.

Those readers who would study this matter a little more deeply are admonished to secure a copy of an article written by Professor John

Dewey, originally appearing in the *Atlantic Monthly,* and subsequently reprinted in *Hygeia,* the health magazine, in February, 1931. This article is entitled "The ethics of animal experimentation from the viewpoint of a philosopher". Here is a man who has always displayed the highest type of humanitarian interest, who had no personal motive in the writing of this article, who was not requested or urged to write it by anyone, but who wrote it solely because he felt that the public did not sufficiently understand the ethics of this practice. In a clear, unbiased manner he has set forth simply, so that anyone may understand, the principles which actuate the scientific investigator in using animals for experimental purposes in the further acquisition of knowledge which may be of value to others.

We have now presented some definite facts and some arguments. In the last analysis, however, the public must choose whether it is desirable to have medical and dental students turned loose with less knowledge than the maximum that may be gained, or whether it is desirable to have these men trained more highly in each successive generation and given a maximum degree of efficiency in the practice of their profession. It is for the public to decide whether the misguided emotions of an uninformed minority are going to dominate the direction of the development of knowledge which may affect the entire population.

Because of the recent acquisition of a bequest left to the National Antivivisection Society by a wealthy matron, this Society has now declared its intentions to introduce a legislative program into 42 states during the next year. It means, therefore, that the people of these states will have a chance to make this decision for themselves. With all confidence in the ultimate intelligence of the American people, I, as an active investigator using animals nearly every day for experimental purposes, am willing to leave the decision in the hands of the people of the United States. If it is the public decision that animal experiment shall cease, I and every other investigator will still find plenty to do. Our only regret will be that we will not be able to accomplish as much as we have reason to believe we would have done otherwise. Contrary to the claims of the antivivisectionist that we must do this work to hold our jobs, we will go on as before, finding plenty of activity—activity which in some instances will be much more pleasing and congenial.

Are we going to revert to a state of civilization in which animal worship will again have a place in practical everyday affairs? Many prominent antivivisectionists with whom I have corresponded have actually put forth the claim that the dog is superior to man in certain elements of character. Volumes have been written about the nobility of character of "man's best friend." Occasionally, an individual dog will display all the nobility of character with which romanticists have endowed the species. But when it comes to a dispassionate evaluation of facts, the human being must continue to hold the preeminent place in the scheme of creation. The horse and cow have certainly contributed far more to the progress of human civilization than the dog.

Shall we then elevate him to a place of immunity from responsibility to man? Various animals have been made objects of such worship. In some parts of the world even the tiger may kill human beings with impunity. Apparently, there are those in modern society who would treat the dog in the same manner. This tendency is of far more serious import to society at large than to the medical profession alone. If man's welfare is to be pushed into the background in favor of dogs in general, if the major portion of society accepts this place, then one must perforce feel considerable pessimism about the future of the human race.

DANGEROUS DINITROPHENOL

" . . . Patients who have hypertension can be medicated with dinitrophenol like other patients. As they lose weight the hypertension is usually improved." It is perhaps malignant neutropenia occurring during dinitrophenol medication that has aroused the greatest professional alarm. Although Tainter and his co-workers have seen no cases of agranulocytosis and have observed no other abnormalities of the blood affecting the hemoglobin or the fragility of the red cells, they feel that the possibility of agranulocytosis must be borne in mind pending further observations.

There seems to be agreement at present that dinitrophenol is a drug of potential dangers when used indiscriminately. Its sale should be restricted to that ordered by the physician's prescription and its use by medical men should be carefully supervised. Probably it should be employed only when reduction of obesity is important and when ordinary dietary methods have failed.—Jour. A. M. A., Dec. 22, 1934.

ADEQUATE HYDRATION IN INFANCY

HENRY E. IRISH, M. D.
CHICAGO

Mr. President and Fellow Physicians: I have selected this subject for presentation today because I know of no therapeutic measure which plays so important a part in reducing the mortality rate in acute infantile illness.

All physicians appreciate the need of fluids in infants who are sick, and it is a common order to "push fluids," which is a good but ambiguous phrase. Few realize the relatively greater fluid intake required by infants as compared to adults.

Normal healthy infants at breast will suckle milk, which is about 85 per cent. water, in amounts varying from two and one-half to four ounces to their pound of body weight in twenty-four hours. Thus, an infant weighing twenty pounds may receive from forty-five to eighty ounces, which approximates the intake of many adults and emphasizes the danger of ignoring adequate fluid intake in illness.

Man may be regarded as a marine animal whose cells live in an ocean of sea water bounded by his skin and mucous membranes. Sea water contains about the same percentage of sodium chloride as human blood, 0.6 to 0.9%, which is about normal salt solution.

In acute illness, there is increased demand for fluids. Fever causes greater water losses in the increased respiration and skin evaporation and if vomiting and diarrhea ensue, the water loss may be enormous and tragic.

An additional complicating factor arises because many sick infants show a determined disinclination to take fluids by mouth in more than sips, thereby reducing the twenty-four-hour intake to dangerous levels. This is most marked when there are painful lesions in the mouth, lips or throat, or if the nares or throat are occluded by secretion, thereby preventing continuous suckling. Likewise, if the reflexes are dulled by disease, then indifference, aversion or non-cooperation may be manifest.

The sites of water intake, elimination and storage in the body are graphically diagrammed by Gamble (Fig. I). The natural site of intake is the mouth, thence to the stomach, which, it will be noted, is an organ of storage and propulsion and in certain disease conditions, elimination, whereas absorption occurs in the lymphatics of the intestine. If the stomach is tolerant (absence of vomiting), fluid if not voluntarily swallowed can be given by nasal gavage, oral gavage or by the fastening of a nasal tube so that it ends about halfway down the esophagus. In premature, asthenic, lethargic or comatose infants when the swallowing reflex is preserved, a device made with a short piece of rubber tubing (three inches)

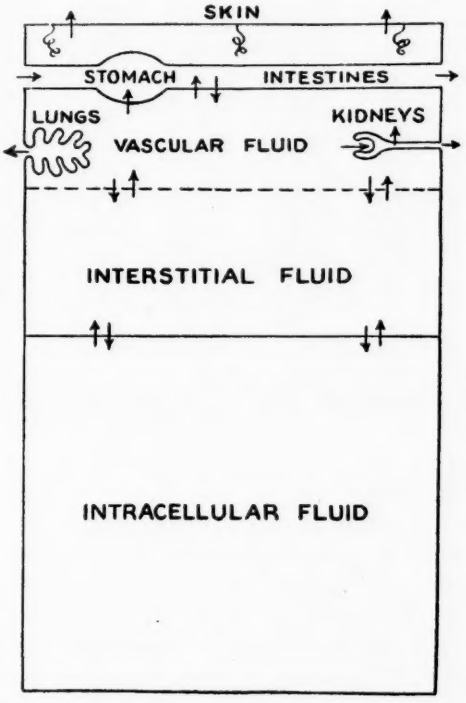

Fig. 1. Water Exchange in the Body. (Adapted from Gamble, N. Eng. J. Med., 1929, 201:909.)

can be affixed to a large medicine dropper, or better, a glass piston syringe, and the fluid can be directed to the buccal mucosa and expelled in drops. A surprisingly large amount of fluid can be introduced in this way.

If after a short test of the foregoing methods, none are applicable or successful then a choice must be made between the rectal, subcutaneous, intraperitoneal and intravenous route. The rectum in infants is easily irritated to expulsion and there is complete absence of retention cooperation, therefore, this route is usually not of much use. It may be of service for a short time if the following precautions are observed. The fluid

Address to the Will-Grundy Medical Society, Joliet, April 19, 1934.

must be of body temperature, nearly isotonic and nearly neutral. The tube must be well lubricated (10 to 15 French) and inserted slowly and gently. The rate of flow must be slow, ten to fifteen drops per minute, to avoid distention and expulsion. The buttocks should be raised and the head lowered. If the buttocks are taped together with one inch adhesive, retention may be aided and the tube can be taped to this binding tape.

there is marked distention, peritoneal adhesions or inflammations. The injection site is located by drawing a line from the middle of Poupart's ligament to the navel, trisecting it, and using the point joining the middle and upper thirds. The needle is directed obtusely downward and cephalically.

Continuous intravenous drip is of great service in desperate cases that require very large amounts

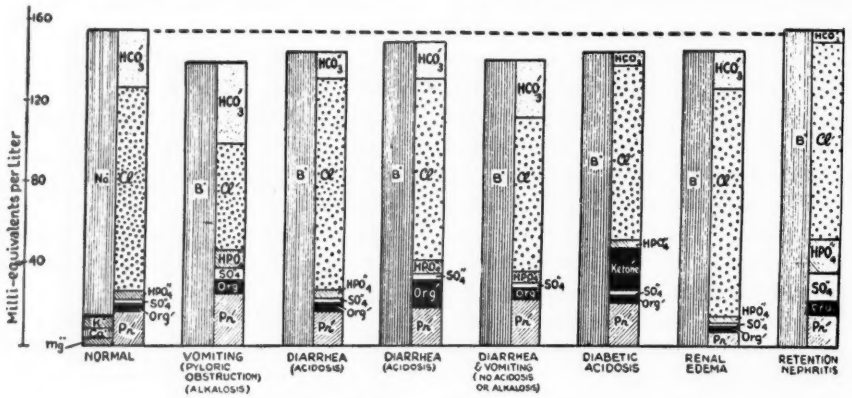

Fig. 2. Plasma Electrolyte Pattern in Various Pathological Conditions. (From Holt's Diseases of Infancy and Childhood, 10th edition, D. Appleton, New York.)

(From Holt's Diseases of Infancy and Childhood, 10th Edition, D. Appleton, New York.)

Suitable opiates or sedatives may dull the expulsion reflex. Sugars, salt, alcohol and water are absorbable; proteins and fats are not.

Fluid is readily absorbed from the subcutaneous spaces and may be given in single injections of about 50 c.c. in one site at one time. Several sites may be used in succession so that 200 or 250 c.c. can be given in a short time. Some pain and shock may accompany the forcing if too rapid. Continuous drip admits of large amounts of fluid and is devoid of discomfort aside from the initial punctures. Suitable restraints to prevent the child from turning or contaminating the needles may be applied with bandages and adhesive. Patients can be hydrated for days and weeks with no apparent discomfort by this method. The best site for injection is the outer aspect of the thighs, the axillary region if dyspnea is absent, or the back if the child must or can lie on its abdomen. Constant surgical asepsis is imperative.

The intraperitoneal route is excellent for large amounts of fluid if the demand is immediate and urgent and 20 c.c. to the pound, if needed, can be injected. This route is not to be used if of fluid promptly at a rate of flow not exceeding 10 c.c. per minute. The veins may be reached through the skin but if not accessible, there should be no hesitancy in exposing and cannulizing the vein under local anesthesia. In certain acute dehydrations with vomiting and diarrhea this method has proved dramatically curative. It can be continued for days if needed.

In any illness the fluid intake must be watched and if any suspicion of inadequacy exists, a fluid chart should be started, recording the time, amount taken, and amount retained orally. If the amount retained is not at least one and one-half ounces to the pound up to twenty pounds body weight for twenty-four hours, efforts to increase it must be instituted at once. This rate should be calculated every eight hours to prevent establishment of severe dehydration. In vomiting with diarrhea, larger amounts are needed. Certain healthy normal breast infants consume as much as four ounces to the pound in twenty-four hours but it is seldom necessary to attempt to force this amount in sickness. A minimum of one and one-half ounces to the pound of body weight for twenty-four hours up to one year

when the average weight is about twenty pounds, is sufficient. After one year it is rare for an infant to require more than three pints (1500 c.c. in twenty-four hours). Occasionally somewhat larger amounts are needed, as in severe diarrhea, but untoward results from superhydration are to be avoided.

The question arises as to what fluid is best adapted to the condition or disease present. All fluids, by whatever route given, are least irritating when nearly isotonic and at body temperature. Much has been written concerning the indications for particular fluids, and variations of opinions as to the effect and fate of the fluids proposed are many. From a practical standpoint without entering into a discussion of the chemistry involved (see Fig. 2), it will be granted as a generally accepted fact that where water alone is indicated, dextrose, five per cent. solution, is harmless and effective. Further action ascribed to five per cent. dextrose is that of supplying sugar to exhausted heart or other muscle; of sparing the liver glycogen; of acting as a diuretic especially in hypertonic (ten per cent.) solution, and of furnishing a buffer action in acidosis.

The salt solutions, normal salt, Richter's and Hartman's solution alike supply water and electrolytes. Much discussion as to the superiority of a solution of single electrolyte and multiple or balanced electrolytes has been recorded. Practically, little or no difference is seen clinically as the body appears able to adjust these solutions to its purposes. We have routinely adopted Hartman's solution because, theoretically at least, it obviates the necessity of attempting Ph determinations insofar as the added lactic acid can act in preventing or correcting a shift of the Ph in either the acidosis or alkalosis direction in both blood and tissues, which reactions may at the same time vary.

They are indicated in excessive salt loss, such as seen in diarrhea and severe vomiting and all are contraindicated in excessive salt retention, as in certain types of nephritis. In depressed states, the sluggishness of the circulation and the vital inability of the cells to absorb the solution may cause any fluid to fail in improving the symptoms. The caloric value of five per cent. dextrose is only about 100 calories to the liter, therefore, full nutrition can not be maintained by this method or even by intravenous ten per cent. dextrose, but I have seen life sustained in cases of peritonitis for two weeks by five per cent. subcutaneous dextrose solutions alone.

Many infections in the injected area are reported. A fresh distillation of the water is of more importance than triple distillation and thorough cleansing of the skin, with careful observation of surgical technic is essential. Commercially prepared solutions in aseptic containers have given a minimum of trouble in our hands. The injection site may be the site of localization of general infections, which localization has seemed to presage the beginning of a favorable termination of the general infection in several instances.

Combinations of dextrose and salines can be used with excellent results simultaneously where dehydration, acidosis and salt loss co-exist.

A supply of solutions with required needles and tubing should be kept in readiness for prompt use in emergencies, so that time can be saved and life spared.

5312 Washington Boulevard.

THE PATHOLOGY OF AVITAMINOSIS

HARVEY S. THATCHER, M. D.,
LITTLE ROCK, ARKANSAS

Since the researches of Funk[1] (1911-1919), in which he corroborated the work of Eijkmann[2] and others (producing polyneuritis in pigeons), research in the relationship of vitamins to nutrition has gone forward with tremendous accomplishment. Funk gave the name "vitamine" to the substances which prevented beri-beri, pellagra, sprue, scurvy and rickets. When one has studied the monographs of Casimir Funk one is overwhelmed with the original resources of a master mind applied to avitaminosis. An immense treasure-house has been discovered in the pathology of avitaminosis, and this valuable material has certain prospects of becoming more vast and more productive in the field of medicine.

Chairman's Address, Section on Pathology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

From the Department of Pathology, University of Arkansas School of Medicine, Little Rock, Ark.

Reprinted from Southern Medical Journal, December, 1934.

In this discussion six vitamins are considered.

VITAMIN A DEFICIENCY

Before the work of Mori[3] (1922) decline of body weight and failure of reproduction reported by Osborne and Mendel[4] (1913) and respiratory disturbances described by McCollum[5] (1917) were the principal changes observed in vitamin A deficiency. Wolbach and Howe[6] (1925) emphasized the specific changes in epithelial tissues, including metaplasia in pancreatic ducts and renal pelves. They also found emaciation, localized edema of testes, submaxillary gland and connective tissue structures of lungs, and focal myocardial lesions. Although their diets were also deficient in vitamin D, other workers did not find any differences when A alone was lacking in the diet.

Mori (1922) described in rats suffering from vitamin A deficiency atrophy of the cells of the para-ocular glands, xerosis conjunctivæ and xerophthalmia leading to keratomalacia and keratinization of the lining cells of the mucosa of the larynx, trachea and ducts of the salivary glands. The work of Fridericia and Holm[7] (1925) related night blindness (nyctalopia) and experimentally proved the delay or failure of development of visual purple in animals lacking vitamin A. Holm's experiments indicated that rats' eyes behave about like human eyes in regard to the function of the uvea, or as to day-sight and night-sight. Aykroyd[8] (1930); from his studies in Newfoundland and Labrador, gave evidence which related this deficiency to functional night-blindness in man, because those on a poor diet developed nyctalopia. He suggested that the term "nutritional dys-scotopia" be given this condition. These studies were related to adults. Pillat's[9] (1929) studies place xerosis of the conjunctivæ as the second stage, night blindness being the first. Xerosis of the cornea next occurred with inactivity of the para-ocular glands and lessened secretion of tears. Keratomalacia was the last stage with infection and blindness. Conjunctival pigmentation was one of the outstanding changes. He reported six cases, describing their passage from simple but usually severe xerosis epithelialis conjunctivæ to xerosis corneæ, to keratomalacia, a disease of the ectodermal elements. Nyctalopia is a disease of the epithelial elements of the eye, the rods and cones of the pigment epithelium of the retina.

Daniels *et al.*[10] (1923) found that rats afflicted with xerophthalmia often had suppurations in the nasal cavities and sinuses. Hetler[11] (1924) obtained the same reactions in the monkey and rabbit with metaplasia of the maxillary sinuses and the mucous membrane of the turbinates and nasal septum. There was calcification of the compact bones of the ear under the membrane. Evans and Bishop[12] (1922) reported cornified cells in the vaginal epithelium as the first sign of vitamin A deficiency. Later (1933) they considered the "vaginal smear method used as a quantitative method for determination of vitamin A." Cornification occurred much earlier than xerophthalmia. Mason[13] (1933) found that changes in the testes occurred earlier than other changes with marked sloughing of the germinal cells and reduction of size of the tubules with spermatogenesis continuing for some time until the process became too severe. Although the testes were similar to those in inanition, yet they did not recover function so quickly. Sampson and Korenschevsky[14] (1932) also found degenerative changes in the seminiferous epithelium.

Bergland, Keefer and Yang[15] (1929) reported secondary anemia in Chinese cured with cod liver oil. Cramer, Drew and Mottram[16] (1922) found thrombopenia in rats, but this has not been definitely established. In advanced stages of their animals there was a marked secondary anemia. Sure and Buchanan[17] (1932) found a relative increase in polymorphonuclear leukocytes and a corresponding decrease in lymphocytes in the majority of pathological animals.

Manville[18] (1933) reported numerous gastric ulcers in rats on an A deficient diet. This work should be confirmed as many careful workers have not found peptic ulcers.

Mellanby[19] has found that diets deficient in vitamin A or carotene, in puppies caused demyelinization of the nerve fibers of the spinal cord. This subject requires further investigation. Changes in structure of the osteoblasts causing bone defects with later changes in odontoblasts and pulp tissue were described by Simola[20] (1932). Osteoporosis was reported by Shipley, McCollum and Simmonds[21] (1921). Wolbach and Howe[22] (1933) considered that vitamin A

deficiency is the most important of the known vitamin deficiencies in its effect upon tooth formation. Their studies were on the incisor teeth of rats and guinea pigs. There is early atrophy of ameloblasts and then the remainder of the organ atrophies. This is in accord with May Mellanby's[23] (1928) conclusions.

Green and Mellanby[24] (1928) stressed the fact that rats developed infection when the diet was deficient in vitamin A, and they concluded that vitamin A is an anti-infective agent. Tyson and Smith[25] (1929) concluded that since hyperplasia in the renal pelvis is greater than keratinization, infection is always present in the earliest stages and in late cases dominates the picture. They also found renal calculi. Green, Pindar, Davis and Mellanby[26] (1931) reported that vitamin A could be used as a prophylactic agent against puerperal infections. Thatcher and Sure[27] (1931), in thirty-eight out of fifty-three rats, found metaplastic changes before decline in body weight or before complete cessation of growth took place. Many rats had metaplastic changes in the posterior portion of the tongue, in the salivary gland and in the respiratory and urinary tracts; some of them had incipient ophthalmia or persistence of the cornified stage of estrum, as the only sign of this deficiency, and others had no external signs of avitaminosis. Bronchitis and pneumonia were also found in several animals, which were gaining in weight before the termination of the experiment. When applied to the human Barenberg and Lewis[28] (1933) and Hess *et al.*[29] (1933) did not observe results indicating resistance to infections. Turner and Loew[30] (1933) found carotene protective against bacterial invasion of the upper respiratory tract in rats. In spite of the research to date on this subject, it has not been proved that pneumonias or other types of infections are dependent upon vitamin A deficiency. The important discovery by Seidmon and Arnold[31] (1932) of the influence of vitamin A (as well as B) upon the intestinal acid-base equilibrium and bacterial flora (deficiency causing a denser bacterial population within the intestinal lumen) is evidence of susceptibility of A deficient animals to infection.

Xerophthalmia and keratomalacia have often been reported clinically. Autopsies of children suffering from A deficiency have been reported by Block,[32] Wilson and Dubois[33] and Thatcher and Sure.[27] Our case clinically and pathologically was that of an infant suffering from vitamin A deficiency. Our histopathologic findings did not conform exactly to those in our rats, but the child had been given cod liver oil after hospitalization. Surely from this evidence certain individuals lacking vitamin A for a long period are susceptible to infections.

VITAMIN B DEFICIENCY

McCollum and Davis[34] (1915) discovered that rats lost weight and developed paralysis of the hind legs on a diet which we now know lacked vitamin B. Polyneuritis in chickens long ago had been observed by Eijkmann. The first studies on the antineuritic vitamin B did not separate the antipellagric factor. Much of the first research was by McCarrison[35] (1919-1920) on pigeons fed polished rice. These pigeons developed polyneuritis with loss of coordination of the muscles. The organs which were atrophic were the thymus, testicles, spleen, ovaries, pancreas, heart, liver, kidneys, stomach, thyroid gland, and brain, in the order of severity. The suprarenals became hypertrophic. Edema occurred with this hypertrophy. These changes, except those of the brain, were present in inanition. Atrophy of the reproductive organs was emphasized. There was little atrophy of the central nervous system. The bones were thinned and there was loss of bone marrow. McCarrison also found atrophy of all of the coats of the intestines, atrophy of the myenteron, degenerative changes in the myenteric plexus of Auerbach, atrophic and inflammatory changes in the mucous membrane and atrophy of lymphoid structures. As there were other deficiencies in the diet those pathologic changes could not be due entirely to lack of vitamin B.

One cannot overlook the careful work of Vedder and Clark[36] (1922) on polyneuritis gallinarum. They did not regard polyneuritis gallinarum as identical with beri beri in man, but found at that time more similarity than differences between the two diseases.

Marrian[37] (1928) excluded the starvation factor and related suprarenal hypertrophy to vitamin B deficiency. Funk and Douglas[38] (1914) related human and avian beri beri. They found atrophy of the various organs and disappear-

ance of the thymus in pigeons. Cramer, Drew and Mottram[39] (1921, 1922) reported atrophy of the lymphoid tissue and lymphopenia in rats with loss of weight, emaciation and subnormal temperature. Zimmerman and Burach[40] (1931) described in dogs, myelin degeneration in the vagus, brachial and sciatic nerves with focal disseminated zones of demyelinization in spinal cords and focal degenerative changes in pons and cerebrum. Irregular loss of myelin, chiefly in the white matter of the spinal cord, less marked in the cerebral cortex, has been reported by Gildea, Kattwinkel and Castle[41] (1930). Moore, Plymate and Andrew[42] (1932), in their extensive examination of peripheral nerves in rats, do not consider myelin degeneration in these nerves as a valid criterion of vitamin B deficiency.

Woolard[43] (1927) observed morbid changes in rats on a B deficient diet and in rats deprived of food, in the intermuscular medullated motor and sensory nerves and their endings. These changes subsided as nerves were examined further from the muscles, except that the lesions in starved animals were not so marked.

Prickett's[44] (1934) data indicated that the lesions in rats were central, rather than peripheral which gave symptoms. He found hemorrhages which involved the nucleus of Dieters, the chief vestibular nucleus, the nucleus of Bechterem, and the nucleus solitarius in approximately 75 per cent. of deficient animals.

Sure and Schilling[45] (1928) found in nurslings of albino rats hemorrhages in the osteogenic tissues, especially in the occipito-parietal sutures. Atrophy of the spleen, hypertrophy of of the suprarenal glands and heart, failure of growth, and dilatation of the stomach with undigested food, were the principal changes observed by Sure, Thatcher and Walker[46] (1931). At that time we found ulcers of the stomach and later Sure and Thatcher[47] (1932, 1933) also reported gastric ulcers (acute and chronic), proving the specific influence of vitamin B for the production of these ulcers by making allowance for the plane of nutrition. We did not find ulcers of the duodena. This might be explained by failure of vagotonus, as nerve changes occur in this deficiency.

Sure and Buchanan[48] (1932) found lymphopenia and a corresponding leukocytosis in albino rats.

The conclusion of Moore and Plymate[49] (1932) that stasis in dilated stomachs and that pylorospasm in rat litters born on a diet lacking vitamin B might relate congenital pyloric stenosis to a deficiency of this vitamin. Atrophic glossitis found in rats on a B deficient diet has been related to man by Hutter, Middleton and Steenbock[50] (1933).

According to Moore and Barlow[51] (1931) the histological changes in bone marrow in pure vitamin B deficiency in pigeons are degeneration and edema and slight endothelial proliferation of small vascular channels, but with active hematopoiesis. The anemia is partly a starvation anemia.

The main pathologic changes in beri beri in man are generalized edema (wet form); degenerative changes in nerves, myocardium and voluntary muscles, dilatation of the heart, and hypertrophy of the right ventricle, and atrophy of muscles (dry form).

A recent important paper by Balford and Talpade[52] (1932) calls attention to the fact that in Southern India, where milled rice is the staple diet, nearly all pregnant females are in a state of avitaminosis. Naturally the infant mortality rate is tremendous. In Japan 17,000 deaths are said to occur from beri beri every year. In western countries there is incipient beri beri in infants. Hoobler[53] (1928) has reported this in the United States.

Shifting the experimental evidence to man, British and American scientists have accepted the B deficiency theory for the etiology of beri beri. Many Japanese scientists are somewhat skeptical about this origin, and many adhere to the infection theory. It must be remembered that an organism was discovered by Matsumura[54] *et al.* of Japan in 1929, a bacillus isolated from the feces of a considerable number of patients suffering from beri beri. They found this organism also in experimental animals suffering from beri beri.

VITAMIN C DEFICIENCY

Scurvy has been known for centuries, but only during the last few years has the antiscorbutic vitamin been linked with the malady. It has been common knowledge that scurvy is a disease of sailors. When Jacques Cartier[55] in 1536 made

his memorable voyage up the St. Lawrence River he lost many of his crew from scurvy. Upon the advice of Indians he gave the remaining men a decoction of bark and leaves of spruce, which they took every other day. Cartier wrote:

"It wrought so well that if all the physicians of Montpelier and Louvaine had been there with all the drugs of Alexandria, they would not have done as much in one yere as that tree did in sixe days."

The tree is believed to be the American spruce from which he made the mixture. It remained for us during this century to learn that the needles contain vitamin C.

In the medical history of all wars scurvy plays an important role. During the World War thousands of soldiers and civilians were incapacitated by it.

The pathologic conditions of scurvy in man have long been known. Hemorrhages, which may occur in any organ, but are especially noticeable in the gums, were emphasized more than other changes. Anasarca, changes in the heart as fatty degeneration, dilatation, enlargement of the right heart, congestion of the lungs, hyperplasia of lymphoid tissue, including Peyer's patches; congestion and enlargement of the spleen; congestion and hemorrhages in the kidneys; fractures of the bones, with subperiosteal hemorrhages, are among the most important findings. Rickets and infantile scurvy are often associated.

The excellent monograph of Meyer and McCormick[56] (1928) described the most important changes in guinea pigs on a vitamin C deficient diet as hemorrhages in the skin, subcutaneous tissue, muscles, urinary bladder, periostea, periodontia, intestines, gallbladder, brain, spinal cord, posterior root ganglia, and nerve trunks; fatty infiltration and degeneration of liver, kidneys, suprarenals, lungs, some skeletal muscles, and so on. There was widely distributed liquefaction of cytoplasm in cell walls resulting in destruction of cartilage cells and cartilage matrix, detachment of periostia and periodontia and reduction of the caliber of bones. There were widespread hemorrhages in bones and teeth, decrease in red blood cells and increase in polymorphonuclear leukocytes. Höjer[57] (1924) in his extensive studies found that odontoblasts and osteoblasts lost their typical appearance, and the product which they yielded deviated more and more from the normal formation. There was general atrophy of connective tissue, muscles, lymphoid tissue, liver, salivary glands, suprarenals, and kidneys. Wolbach and Howe[58] (1926), with due credit to the work of Aschoff and Koch[59] (1919) and Höjer[57], concluded that the condition of scorbutus is inability of the supporting tissues to produce and maintain intercellular substances. There were defects in the capillary walls due to failure of endothelial cells to form cement substance, and this defect applied to connective tissue and teeth. They criticized Höjer's findings of osteodentin or pulp bone, because his diets were not entirely deficient. They found a shrunken pulp free from dentin floating in liquid. With orange juice the dentin appeared. They found that production of matrix of bone ceases and maintenance of existing bone matrix is interfered with as shown by osteoporosis. In repair of bone there was absence of matrix. There was avascular organization without the formation of collagen or bone matrix. Zilva and Wells[60] (1919) reported fibrosis or fibroid degeneration of the pulp of the teeth in monkeys and in guinea pigs. At that time they predicted caries of teeth in man. Marked defects in the teeth may occur in scurvy when the disease is in a mild form.

McCarrison discovered enlargement of the suprarenal glands in guinea pigs suffering from scurvy. The most characteristic lesions in these animals were said by Bessey, Menten and Kime[61] (1934) to be depletion of fat and cholesterol from the cortex of the suprarenal.

Medes[62] (1926) found degeneration of germinal epithelium in the testes of guinea pigs.

The study of the nervous system has been neglected, but Meyer and McCormick[56] (1928) reported degenerations in the peripheral nerves and in the large motor cells of the anterior horn. Hess[63] (1918) saw a large focal degeneration of the lumbar cord in a child with infantile scurvy.

During the war Aschoff and Koch[59] made exhaustive studies on prisoners (Turkish, German and Austrian) suffering from scurvy. There was a striking similarity in the pathologic changes observed by these scientists and others, with those changes described in the guinea pig.

Peptic ulcers in the guinea pig were related to a partial but chronic vitamin C deficiency by Smith and McConkey[64] (1933). The usual site was in the first portion of the duodenum

just distal to the pyloric sphincter. A few were in the pyloric portion of the stomach near the lesser curvature.

Presnell[65] (1934) reported a longer blood clotting time in this deficiency, as well as a diminution of blood platelets.

Hanke *et al.*[66] (1932) related dental caries to vitamin C deficiency in extensive studies of numerous children. Diseases of oral tissues, such as gingivitis, periodontitis, or dental caries, occurred in vitamin deficient diets, especially those lacking vitamin C. Vitamin D was also related by them to dental caries. They noted that caries increased during puberty, but not so greatly as was believed. They found that citrus fruit juice overcame in many individuals hereditary defects and the effects of caries during puberty. Hess[67] believed, in 1917, and continued to believe that infantile scurvy is not, however, a simple dietary disease but that diet allowed intestinal bacteria to elaborate toxins. Evidence is to this effect because McCollum and others found pathologic lesions in bones, similar to scurvy, in rats which suffered from polyneuritis.

The finding of a subdural hematoma in infantile scurvy by Gilman and Langer[68] (1932), with a summary of thirteen other proved cases from the literature, should call the attention of pathologists to this condition.

Few pregnancies in scorbutic guinea pigs, with abortion and resorption, were noted by Kramer, Herman and Brill[69] (1932).

Rinehard and Meltier[70] (1933) found that in uncomplicated scurvy, atrophic and degenerative changes occurred in the heart valves (collagenous stroma), but with added infection, degenerative and proliferative lesions were present. They were similar in type to the Achoff reaction in acute rheumatic fever. They also related the pathologic changes in the joints in the two diseases.

A recent communication by Prof. Szent-Györgyi[71] (1934) before the British Association for the Advancement of Science states that ascorbic acid cures certain types of hemophilia (not the hereditary type), pyorrhea and hemorrhagic nephritis. Disfiguring colorations in the skin in Addison's disease can be bleached out by ascorbic acid.

The importance of vitamin C in the diet would appear to be greater than was formerly believed.

VITAMIN D DEFICIENCY

Rickets has also been known for many centuries. The first accurate description was made by Glisson in 1650. Before this century its etiology had been unraveled to a great degree, but its pathogenesis is still somewhat of an enigma.

The pathology of rickets is so well known that it is unnecessary to review it in detail. Much credit should be given to the great research of Schmorl[72] (1909). The main changes are lack of calcification and growth of long bones, deformities of the thorax and pelvis, hyperemia of the periosteum, bending of the long bones, abnormal redness of marrow, and wide fontanelles with edges thin. Microscopically the costo-chondral and other epiphysial junctions are altered. There is lack of order in the zone of calcification, with overgrowth of the cellular layer and failure of calcification. There is rachitic periostitis. The marrow contains numerous sinuses and there may be atrophy of cellular elements. Enlargement of the spleen, thymus and lymphoid tissues, including tonsils and adenoids, occurs. There is a type of rickets reported by Macke and Todd[73] (1929), with no involvement of the osseous system, but other changes are noted.

The experimental production of rickets by Mellanby[74] (1919) revealed a new angle, since he found that cod liver oil prevented the disease more efficiently than did butter fat. McCollum *et al.*[75] developed the "line" test, a quick method to demonstrate rachitic changes, and pointed to a causative factor other than vitamin A deficiency, which later was known to be vitamin D.

Howland and Cramer[76] (1921) added important information, since they showed that calcium and phosphorus in the serum changed in rickets with a marked decrease in inorganic phosphorus. This led to the correlation of tetany with the low calcium form of rickets. In 1921 Sherman and Papenheimer[77] produced rickets in rats on a diet low in phosphorus. This was important, as calcium deficiency had been considered of great importance and the phosphorus ion $CaPO_4$ of no consequence in rickets, although calcium occurred mainly as the phosphate, $CaPO_4$. Another Columbia University scientist, Zucker[78] (1921-22), produced rickets in rats on a diet with an excess of base over acid, and related it to the

production of the disease in the human when the acidity of the intestinal tract was lessened.

Sunlight had been known for a long time to have curative effects in rachitism. Another great step in the experimental work was the discovery that ultraviolet rays cured the disease (Huldschinsky[79] (1919), with numerous confirmations). It remained for a remarkable discovery to be made by Steenbock and Block[80] (1924). Rat rations irradiated by the mercury quartz lamp could be activated so that growth and bone calcification occurred to the same degree as when rats are irradiated. This knowledge has been greatly extended and in 1927 Rosenheim and Webster[81] (1927) produced artificially the antirachitic vitamin by the action of ultraviolet light on ergosterol. Windaus[82] (1927) and Hess[83] (1928) simultaneously found that ergosterol and not cholesterol was the "provitamin" of the antirachitic factor. Windaus, a Nobel prize winner, related the sterols to vitamin D. In this photochemical transformation into vitamin D he believed that there was only a stereochemical or structural rearrangement leading to an increase of the spatial size of the molecule.

Mrs. Mellanby and her coworkers[23] (1928), after experimental work on rachitic puppies, concluded that vitamin D had a beneficial effect on the teeth, causing them to harden and arresting dental caries. She claimed there was lack of sunlight in England, and that heavy clothing prevented the sun's rays from reaching the body. Since there was an increased use of cereals lacking vitamin D and a decrease in consumption of milk, butter and eggs, this vitamin was not supplied in sufficient quantities. This was her explanation for dental caries in England and America. Hess[84] (1929) agreed with this research, but considered there were other factors, also.

Lilly[85] (1932) did not produce experimental dental caries in the white rat on a vitamin D deficient diet. Templin and Steenbock[86] (1933) found that irradiation of rats' rations gave a marked improvement of dental structure; that on a low calcium diet the teeth were improved but not exactly normal.

Thatcher and Sure[87] (1934), during the last few months, studied the main tissues of 63 rats suffering from rickets. There was hyperplasia of the lymph nodes in nine animals. According to Hess this is a frequently occurring change in rickets. One rat had a localized chronic fibrous myocarditis. The testes examined showed active spermatogenesis. However, four testes (including one control) were immature and the tubules small, with no spermatogenesis. The ovaries examined contained normal follicles, corpora lutea and follicular cysts illustrating maturation and ovulation. There was no perifollicular hyperemia, atresia, or pseudo-atrophy, as reported by Pallot and Mouriquand[88] (1933). We did not observe parathyroid hypertrophy, as observed by Doyle[89] (1925) in rachitic chickens.

Vitamin D deficiency has been related in the field of dermatology to acne vulgaris by Doktorsky and Platt[90] (1934), and onychia (with B_2) by White[91] (1934). These studies will require much more clinical evidence correlated with experimental data.

The story of rickets, osteomalacia and tetany is not complete. With the knowledge of many factors involved the etiology, to a certain extent, is explained, yet much is left unanswered.

VITAMIN E DEFICIENCY

The discovery of the antisterility vitamin was made by Evans and Bishop[92] (1922), Sure[93] (1923), and Mattill and Stone[94] (1923). Evans and Bishop secured priority in publication, yet Sure's results were steadily accumulating from another angle before that time. Mattill and Stone (1923) made similar observations; therefore, these scientists are regarded as codiscoverers of vitamin E.

The female rat without vitamin E becomes pregnant, but fetal death occurs between the twelfth and twentieth days. In the yolk sac there is failure of development of entodermal villi and blood vessels, and in the embryo there is impairment of blood vessels and mesenchyme. Mattill, Carman and Clayton[95] (1924); Evans[96] (1925), Parkes, and Drummond[97] (1925), and Mason[98] (1926) found sterility in male rats. According to Mason, after extensive studies, deficiency of vitamin E results in

"an excessive liquefaction of the chromatin material, first in the spermatozoa and spermatids and later in less mature cells, followed by extensive fusion, especially of injured spermatids and spermatocytes into a typical type of giant cell of variable size."

When spermatogenic activity ceased the earliest structural changes were preceded by some

fundamental physiological disturbance of a distinctly irreversible nature. Abortion is frequent in sheep in parts of Scotland, but only one out of 36 animals aborted when treated with concentrate containing E, A and D vitamins (Dujerre,[99] 1933).

According to Vogt-Moller[100] (1933) 25 cases of infertility in women (20 cases of habitual abortion and 5 cases of sterility) were treated with wheat germ oil (commercial product called "fertilan") and wheat germ, with the result that living children were borne by 17 of the 20 cases of abortion.

As vitamin E is widespread in nature one would at first believe that this deficiency is of no import to man; yet in degerminated cereals vitamin E had been removed during the process of milling. We consume much of this type of cereal, and during the depression many individuals are practically existing on them. Is it not reasonable to assume that there are cases of unexplained sterility in the human due to vitamin E deficiency? More clinical studies need to be correlated with the experimental data now available.

VITAMIN G (B_2) DEFICIENCY

Perhaps no disease related to diet has caused more controversy than has pellagra. The spoiled maize theory has thoroughly saturated the literature, and the ideas of prominent zeists as Marzari,[101] Balardini,[102] Morelli[103] and Roussel[104] still persist.

Levene and Muhlfeld[105] (1923) found that the growth promoting and antineuritic principles in brewers' and bakers' yeasts were not necessarily the same. Smith and Hendrick[106] (1926), followed by Goldberger, Wheeler, Lillie and Rogers[107] (1926) demonstrated the dual nature of the vitamin. Goldberger[108] (1922) had previously produced pellagra-like lesions in six convicts by a diet deficient in protein or amino-acid. This prison farm experiment was criticized by many scientists, including MacNeal[109] (1922), Hindehede[110] (1923), and Jobling and Peterson[111] (1917). The specificity of the lesions was greatly questioned. The most important criticism offered of this experiment was the fact that it was not accomplished in a non-pellagrous community, even if it be accepted that the convicts developed unquestionable pellagrous symptoms.

Experimental production of pellagra-like changes in the albino rat were studied by Goldberger and Lillie[112] (1926), Chick and Roscoe[113] (1927), Hunt[114] (1928), Salmon, Hays and Guerrant[115] (1928), Sherman and Sandels[116] (1929), Findlay[117] (1928), Thatcher, Sure and Walker[118] (1931) and Roscoe[119] (1933). Goldberger and Lillie[111] (1926), in their report of pellagra-like symptoms in the albino rat included dermatitis and stomatitis which they related to pellagra. Findlay[117] found growth failure; histologic characteristics of inanition with hypertrophy of the suprarenals; atrophy of the testes, and lesions of stomach and tongue. Thatcher, Sure and Walker[118] did not consider the histologic changes in the skin absolutely comparable to those in human pellagra. We found no stomatitis, but did find gastric ulcers. Ophthalmia was present. Day, Langston and O'Brien[120] (1931) later discovered cataracts. No changes were found in the nervous system (Gunker and Kandel,[121] 1933). Parson and Kelly[122] (1933) observed pellagra-like conditions produced by egg white in rats on well supplemented rations. This appeared to involve an interrelation between a positively toxic cause and a relative absence of a protective factor, rather than a simple deficiency. Anemic rats fed a G deficient diet recover from the anemia (Stucky and Brand,[123] 1933), although anemia is one of the complications in late pellagra. Wheeler[124] (1931), in his overenthusiasm for his former chief, Goldberger, has exaggerated scientific facts to comply with the deficiency theory. No one will belittle the carefully planned work of Goldberger, yet it is possible to concentrate on one phase of a subject too long and become oblivious to all other angles.

The experimental black tongue syndrome in dogs was related to pellagra and lack of protein in the diet by Underhill and Mendel[125] (1928). Goldberger and Wheeler[126] (1928) later prevented and cured black tongue by autoclaved yeast. Rhoades and Miller[127] (1933) produced chronic black tongue in dogs, with an accompanying anemia, atrophic glossitis, diarrhea and loss of weight.

A disease similar to pellagra is reported in chicks on a G deficient diet (Kline, Keenan, Elvelyem, Hart,[128] 1933).

Harris[129] (1913) reported pellagra in three monkeys (*Macacus rhesus*) which were inocu-

lated with the filtered juice of tissues from pellagrins. No one has been able to reproduce these experiments, yet all scientists who saw the monkeys agreed that the condition was pellagra. Stockman and Johnson[130] (1933) have reported a disease having the pathological characteristics of pellagra in monkeys, rabbits and guinea pigs, which occurred whenever the diet was rich enough in cereals. These authors discounted "the vitamin hypothesis" and regarded cereal *per se* as the cause.

Another viewpoint is represented in the report by Strauss and Castle[131] (1933) that macrocytic anemia of pregnancy may be due to lack of what has been called the extrinsic factor essential for the specific reaction with the intrinsic factor of normal human gastric juice. For hematopoiesis in pernicious anemia the essential dietary component may now be defined as a substance closely related to vitamin B, if not B_2 itself. Glossitis, with anemia, has been related to the B complex (Miller and Rhoades,[132] 1932).

Some of the prominent changes in pellagra are emaciation; rarefaction of the spongiosa and of cortical layers of the bone; cutaneous lesions, dependent on the stage of the disease, such as erythema and edema of the corium, hyperplasia of the rete and parakeratosis, hyperkeratosis and hyperpigmentation, and various degenerative changes in the central nervous system, depending upon the stage of the disease. In the gastrointestinal tract there is congestion and inflammation of the tongue, imperfect repair of the membrana propria in the pharynx, tongue, and esophagus, and hyperemia of the intestines with inflammation of the large intestine. Numerous cellular changes are noted in the brain and cord, consisting of chromatolysis of nerve cells, satellitosis, astrocytosis, and the presence of ameboid glial cells in the acute stages. In the chronic stages there are fatty and fibrinoid degenerations, regressive changes of the nerve cells, chronic nissl changes of the nerve cells, increase of glial fibers, permanent destruction of nerve fibers, and a marked increase of amyloid bodies. Early arteriosclerotic changes in the brain are important. All of these changes should be studied according to the stage of the disease. In the eye there is atrophy of the choroidal pigment and cataract (summarized by Thatcher,[133] 1931).

The changes present in rats and in dogs fed on a diet lacking vitamin G are not correlated so readily with human pellagra as the pathological changes in scurvy, beri beri and rickets in certain animals. Many American scientists do not accept the vitamin G deficiency theory in its entirety, although it is admitted that yeast may be a preventive and a cure in many cases. A cure, however, does not give us usually the etiology of a disease. Roberts[134] (1920) has records of 25 pellagrins whose diets contained plenty of well-balanced food, yet who developed the disease. They did not take a well-balanced diet, in spite of the opportunity, and pellagrous symptoms resulted.

The discovery of the vitamin activity of the flavines by György, Kuhn and Wagner-Jauregg[135] (1933) is outstanding because the flavines appear to be a major component of the vitamin B_2 complex.

Vitamin G deficiency therefore does not explain all of the phases of pellagra. We have not excluded all of the arguments for the parasitic theory for the cause of pellagra. We have not proved that the photodynamic theory has not considerable merit. Jobling and Arnold[136] (1933) isolated organisms (*Aspergillus glaucusrepens group*) from the stools of pellagrins, which produced fluorescent substances. Extracts of these organisms were inoculated into a series of mice, and these mice when exposed to light developed prominent lesions.

It will be important to follow the research upon pellagra during the next decade.

CONCLUSION

It is possible that more vitamins will be discovered when we know more about their exact chemical constituents. Harris[137] (1932) has tabulated the claims of many authors concerning as many as 17 unclassified new factors, having usually a distribution similar to vitamin B. It is to the fundamental science of pathology that we must turn to identify these vitamins. Many reports from the literature are by scientists who have no knowledge of pathology, and have not even called to their aid skilled pathologists. Symptoms are not clearly differentiated from pathological changes, and the interpretation of morbid conditions certainly is not grasped. The biochemist must work with the pathologist and the pathologist must cooperate with the physiolo-

gist and anatomist, and this cooperation must continue down the gamut of the fundamental sciences.

We are dealing evidently here with some of the building-stones of the human organism. We can say truthfully with Aeschylus, "And here for men is remedy for ills a many."

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A CLINICAL STUDY OF PYRIDIUM IN URETHRITIS

MAURICE B. WOLFF, M.D.

CHICAGO

Laboratory studies of the gonococcus indicate that gonorrhea should be amenable to treatment with most any sort of antiseptic. The causative organism when compared in the laboratory with other types of pathogenic bacteria is found to be delicate. It is quite sensitive to both temperature changes and desiccation; and it is grown with difficulty even on special culture media. The optimum temperature for its growth is 37 C. But it is so sensitive that below 30 and over 42 it will not grow at all. Under only slight variations from the optimum temperature, its colonies undergo autolysis and die rapidly after 6 to 8 days. The organisms are likewise nonresistant to chemicals; and on the Petri dish or in the test tube, many antiseptics even in weak dilution will kill the gonococcus.

In the body, however, the gonococcus has a tendency to penetrate quickly to parts not easily accessible to antiseptics. The gonococcus is doubtless no more resistant in the body than in the laboratory; and many antiseptics which kill it on the Petri dish or in the test tube will doubtless kill it in the body just as quickly, provided they come in contact with it. Clinical experience has established the fact, however, that killing the organism in the laboratory and eradicating it from the body are two entirely different matters.

If the gonococcus did not penetrate into the urethral mucosa and urethral glands, but remained confined to the surface, then killing it in the body would be almost as simple as killing it in the laboratory. As a matter of fact, if quick action is taken after the start of the infection in treating the surface of the urethral mucosa with an antiseptic, before the organisms have had time to penetrate, instant annihilation of the invaders may sometimes be accomplished. To abort the disease in this manner, however, no time dare be lost, as sometimes within even less than 24 hours in a virulent infection the gonococci have already started to penetrate the deeper structures. After this has happened, there is no further chance of aborting the disease.

Most antiseptics, supposedly, produce their deleterious effects upon the gonococcus by coagulating its albumin. In mild form, they may be used in the urethra without much damage to the mucosal cells; but, if used in stronger concentrations, they devitilize or even kill the surface epithelium, causing shreds of tissue to slough off, and opening more area to the penetration of the infection. Sometimes, when the deeper tissues are damaged, strictures are caused, due to the formation of scar tissue with subsequent contraction. Such antiseptics lose part of their effectiveness through combining with tissue albumin; and, by building up a wall of devitilized tissue ahead of them, limit their own penetration into the tissues. The penetration of such antiseptics is practically nil. Because of such circumstances, there has long been a need for an antiseptic capable of penetrating the deeper parts of the urethral mucosa without damage to the tissue cells.

In recent years, a new class of antiseptics has been developed. These are the dye antiseptics. They produce their deleterious effect upon the gonococcus by an intense staining which interferes with the vital cell processes of the organism. These antiseptics do not coagulate albumin. It is true that, just as with the antiseptics which act by coagulating albumin, the antiseptic dyes produce the same affect upon the tissue cells as upon the gonococcus or other pathogenic bacteria. However, there is this difference, and it is an important one—coagulating the albumin of a tissue cell is just as damaging to it as it is to the bacteria; whereas staining, while devitilizing to the bacteria, may merely have a stimulating effect upon the tissue cells. This difference is likely due to the fact that the antiseptic dyes, like the dyes in general, have a greater affinity for vegetable matter than for animal tissue; and, consequently, stain the vegetable matter of the gonococcus and other bacteria with greater intensity than the animal tissue of the mucosal cells.

One of these antiseptic dyes was selected for trial in the treatment of a series of gonorrhea cases in the male. The dye selected, pyridium, is chemically phenylazo-alpha-alpha-diamino-pyridine hydrochloride. When it is given internally, it appears in the urine in from 45 to 60 minutes, staining it a reddish orange. This dye chemical is very low in toxicity and is practically always well tolerated, unless in rare cases where there is some impairment of kidney function. The preparations of the chemical used in this investigation, were the 0.1 gram sugar-coated tablets for oral administration; and the 1 per cent solution, and its dilutions, used locally.

The series treated consisted of 125 cases of acute anterior urethritis. The dye treatment was used in 77 of them, while 48 control cases were treated by other methods. In order to get as definite a check up as possible as to the value of the newer dye treatment over the older treatments, a close routine was followed in the diagnostic and treatment procedures. At the first visit, the history was obtained. If not the first attack, the number of previous attacks was recorded, together with the date when the last previous attack was considered cured. The general physical condition, home and working conditions were inquired into and recorded, as these things naturally frequently make a difference in how much and what sort of personal treatment the patient can take. The symptoms and the amount and character of the discharge were noted; and the gonorrhea classified into acute or chronic, simple or complicated, anterior or posterior. The actual diagnosis was, of course, always based upon the demonstration of the gonococci in the urethral smears.

At every subsequent office visit during the treatment, progress notes were made—the symtoms again noted, the two-glass test made, and smears examined—not only for gonococci, but

also to observe the character of the discharge in regard to pus, debris, epithelia, etc.

Usually in about 45 to 60 minutes after the internal administration of the first dose of pyridium, the urine begins to take on a reddish orange color, gradually acquiring a deeper and deeper color after additional doses. Inasmuch as the therapeutic effect of pyridium depends upon intense staining, enough should be given to maintain a deeply colored urine in order that the urinary canal should be heavily and constantly stained. The intensity with which the urine is colored is a very good check upon oral administration. During the acute stage, when many of the cases evidence discomforting symptoms, such as urgency, frequency, burning or irritation, two 0.1 gram tablets of pyridium were given orally, t.i.d. It seemed to be practical, after the symptoms were reduced and the patient made comfortable, which was usually in not more than two or three days, to reduce the dosage to one 0.1 gram tablet, t.i.d.—if this was enough to always maintain a deeply colored urine. This dosage then was usually carried along until treatment was completed. In some cases, however, it was found necessary to increase the dosage again to two 0.1 gram tablets, t.i.d. in order to maintain the desired intense staining quality of the urine. A few cases required three tablets, t.i.d.

In a very few of the 77 cases, pyridium was not freely tolerated, due apparently to an idiosyncrasy of the patient; though no cases were found in the entire series who could not tolerate three 0.1 gram tablets daily, particularly if given after meals. In the cases in which a heavier dosage—two or three 0.1 gram tablets, t.i.d—was tried than could be tolerated, the symptoms were usually slight headache, nausea, and in some cases, slight intestinal colic. The symptoms of intolerance were never of any great degree of severity, and were always promptly alleviated upon reducing the dosage.

In 50 of the 77 cases treated with pyridium orally, the chemical was also used locally. The 1 per cent solution was diluted to 1-4000 to 1-1000 for office irrigations; and to 1-400 to 1-200 for hand syringe injections at home, always starting with the weaker dilutions. In some cases the office irrigations were given daily, and later cut down to two or three weekly. The hand syringe injections varied from 3 or 4 daily to 2 daily in the later stages. In these 50 cases, treated with pyridium both internally and locally, only four suffered complications. One case developed acute epididymitis due to a trauma from the carelessness of the patient. Three cases went posterior, due to relaxation of the cutoff muscle. At least two of these were due to misuse of hand injections. The other 46 cases progressed uneventfully to recovery—recoveries being verified by the usual methods, such as provocative smears, urine examinations, prostatic massage, blood test and endoscopy in some cases. The average time of treatment in this group was unusually short, being from 2 to 5 weeks.

In 27 other cases of the series, pyridium was given orally; but locally, instead of pyridium solution, pot. permanganate, dilutions of the silver salts, and other antiseptics were used in office irrigations and by hand syringe injection. In this smaller series, there were more complications: two cases developed acute epididymitis; while four went posterior, some of the latter cases being due to misuse of home injections. The other 21 cases progressed to recovery satisfactorily; but took somewhat longer than the average in the group treated both orally and locally with pyridium, the average time of recovery being 6 to 8 weeks.

Control Cases. The other 48 cases of acute anterior urethritis were treated by other methods, no pyridium being used either internally or locally. Instead of pyridium, sandalwood oil, balsam copaiba, hexamethylenamine, etc., were given internally; while locally for office irrigations and hand syringe injections, pot. permanganate, silver proteins, and other antiseptics were used. In this group there were many more complications—three cases developed acute epididymitis, six cases went posterior, and seven became chronic—classified as such after 3 months' treatment. The other 32 cases progressed to recovery more slowly than either of the other two groups, averaging 8 to 12 weeks.

Conclusions. This investigation has been concerned with acute anterior urethritis only. Most cases come under medical care when in this first stage; and unquestionably it is here that intelligent treatment is of greatest importance. If acute gonorrhea can be successfully treated, there will be fewer chronic cases, complications, and

sequellae to worry about. It seems important that in the group of cases in this series treated with pyridium there was an unmistakably lowered incidence of complications.

In a large number of these cases in which pyridium was given orally, a rapid reduction of the discomforting symptoms was markedly noticeable, giving the patient quick and gratifying relief. Acute fulminating type cases with profuse discharge rapidly came under control with the discharge reduced so that it was not evident, unless squeezed out of the meatus. Patients in general, and particularly those with experience with other treatment, warmly appreciated the great relief and radically lessened discharge.

Another important consideration was the lowering of the average time required for recovery in the pyridium treated cases:

Pyridium—internally and locally.....2 to 5 weeks
Pyridium—internally only .....6 to 8 weeks
Control Cases—no pyridium.....8 to 12 weeks

A drug to be efficient in the treatment of gonorrhea should have the following properties:

1. Antiseptic
2. Astringent
3. Penetration
4. Stimulation

All of the drugs used for many years have one or more of these properties—from a clinical standpoint. The pyridium treated cases here reported needed no so-called "after treatment" to get rid of shreds, desquamation and debris, therefore it may be clinically assumed that it fulfills all of the four requisites specified above; and is, therefore, the best single drug treatment for gonorrhea, if used intelligently, and in cases that show plainly specific indication for its use.

It is quite evident, judging from the clinical effects obtained in this series of cases, that pyridium is a valuable therapeutic agent.

185 N. Wabash Ave.

THE CLINICAL VALUE OF ELECTRO-CARDIOGRAPHY

J. Bailey Carter, M. D.
CHICAGO

Electrocardiography has established a definite place for itself in clinical practice. A cardiovascular examination is incomplete without an electrocardiogram. An electrocardiograph is as essential to the study of heart disease as is the x-ray in the study of other diseases of the chest. It reveals a source of information regarding the integrity of the heart which is frequently inaccessible to any other method of examination. In a broad sense, electrocardiography is concerned with two and only two cardiac functions, i. e., impulse production and impulse transmission. It is only when these functions are disturbed that the electrocardiogram is of service in the study of heart disease.

Electrocardiography is especially valuable in the study of the cardiac irregularities. Sinus arrythmia, a common and benign irregularity, if complicated by extrasystoles, may be mistaken clinically for auricular fibrillation.

The importance of extrasystoles varies. The majority are benign. Some represent simply a toxic or functional disturbance. Others may indicate organic myocardial changes responsible for definite symtoms of heart disease. Associated electrocardiographic evidence may be helpful in reaching a clinical decision. The significance of extrasystoles also depends upon the location of the abnormal focus giving rise to the ectopic beats. Likewise, extrasystoles from multiple foci are of more serious prognosis than are those arising from a single focus. Finally, extrasystoles from multiple foci in both ventricles are indicative of more widespread myocardial reaction than if from only one ventricle. Multiple ventricular extrasystoles frequently initiate attacks of ventricular tachycardia. They may be forerunners of ventricular fibrillation and indicate a bad prognosis. The exact localization of these ectopic beats is impossible without the aid of graphic methods. Extrasystoles, so different from auricular fibrillation in significance, at times, may be differentiated clinically with difficulty.

Paroxysmal ventricular tachycardia is of more significance than is the auricular or nodal form since it is more commonly a precursor of ventricular fibrillation. The auricular form of paroxysmal tachycardia is usually benign. Differentiation of auricular, nodal, and ventricular forms of paroxysmal tachycardia is made with certainty only by means of the electrocardiogram.

An auricular flutter, at times, may be clinically differentiated from a paroxysmal tachycardia with difficulty. An auricular flutter with

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a 2:1 ventricular response may be mistaken clinically for a simple sinus tachycardia. Likewise, without the aid of an electrocardiogram, an auricular flutter with a 4:1 block may be missed entirely. As a rule an auricular flutter with a varying degree of auriculoventricular block can be differentiated from auricular fibrillation only by means of graphic methods.

Auricular fibrillation, in the vast majority of cases, is readily diagnosed clinically. It is frequently difficult to recognize the arrhythmia in the presence of a very slow or very rapid rate. Without the aid of an electrocardiagram, such an auricular fibrillation may remain unrecognized; its recognition may alter the prognosis and therapy markedly.

Electrocardiography also enables the clinician to detect disturbances in stimulus conduction. Clinical recognition of the milder forms of heart block is difficult, often impossible, without graphic records. This is especially true when the partial block is of the type that consists of prolongation of the P-R interval. Nevertheless, this is one of the frequent early manifestations of rheumatic heart disease and occasionally the only means of diagnosing myocardial involvement in a case of rheumatic fever, or, less frequently, in other acute infections. At times, complete auriculoventricular block, partial 2:1 block, and sinus bradycardia can be differentiated only by graphic methods. More significant still is the differentiation of auricular fibrillation and partial auriculoventricular block with dropped beats, since the proper treatment of the two conditions is radically different. Occasionally an unsuspected bundle branch block is revealed by electrocardiography. The importance of such a revelation is readily appreciated.

Graphic evidence of myocardial involvement may be obtained before the diagnosis from the clinical signs and symptoms is possible. Graphic evidence alone is frequently significant of myocardial damage in recent coronary occlusion, in overdigitalization, and in bundle branch block. When, however, the changes are slight or occur in a record from an elderly patient, it is often impossible to make a definite diagnosis. Hence, usually, such evidence should be correlated with the clinical observations. Electrocardiography, as a rule, yields no information regarding the etiology of the myocardial damage. There is nothing in the graphic record to indicate whether the involvement is organic, toxic, or the result of ischemia. There is nothing to indicate whether it is acute or chronic. The peculiar changes which result from overdigitalization or from a recent coronary occlusion are practically the only exceptions. The degree of graphic abnormality does not parallel the amount of myocardial damage. Extensive involvement of a silent area of the myocardium may result in little or no graphic change. A localized lesion involving the conduction system gives rise to extensive alterations in the electrocardiogram.

The amplitude of the ventricular complex is not a dependable index of the force of cardiac systole. The efficiency of the heart cannot be determined by graphic methods. Complexes of high amplitude frequently, but not always, indicate a healthy myocardium "Low voltage" usually, but not always, indicates myocardial failure.

Probably the most important indication for employing graphic methods is in the study of substernal, precordial, or upper abdominal pain of sudden onset. Here the occurrence of the striking and distinctive changes resulting from a recent coronary occlusion is of great assistance in differentiating this condition, especially atypical attacks thereof, from acute abdominal disease; thereby avoiding the serious results of operative intervention.

The contour of the curves of the normal electrocardiogram is constant for the individual over long periods of time. A recent coronary occlusion produces a series of graphic alterations which show definite changes from day to day. Serial electrocardiograms taken at frequent intervals reveal changes indicative of early coronary occlusion in almost 100% of patients. By following the rapidity of these changes some idea of the rate of recovery or progress can be reached. More conclusive evidence regarding the myocardial lesion may be obtained from such a series than from a single record. Serial electrocardiograms should be taken routinely in all cases of suspected coronary occlusion. At times coronary occlusion may lead to non-specific alterations of the electrocardiogram, viz., "low voltage," bundle branch block, extrasystoles, paroxysmal tachycardia or fibrillation. The sudden appearance of such changes in a patient clinically suspected of coronary occlusion should be taken seriously. Occasionally coronary sclerosis may give rise to graphic changes

indicative of coronary occlusion. Rarely, clear cut cases of the condition are seen without the occurrence of any noticeable alterations in the graphic record. While the definite and distinctive changes of coronary occlusion are to be taken seriously, it is, nevertheless, poor policy to ascribe to coronary occlusion an electrocardiogram showing minor alterations.

The electrocardiogram aids in the treatment by accurately determining the arrythmia present. Rational therapy is thereby made possible. It is also of value in detecting the early toxic effects of digitalis and other cardiac drugs. It is the only means of detecting the early signs of heart block due to overdigitalization. Digitalis may produce all grades of heart block. It often produces fairly characteristic T-wave alterations. Digitalis may cause sinus arrest, extrasystoles, pulsus bigeminus, groups of ectopic beats, paroxysmal tachycardia and fibrillation. Knowledge of the clinical picture and therapy aids in the interpretation of the graph because digitalis may produce any type of record. The "digitalis T-wave" may occasionally occur in other conditions. At times, in the treatment of auricular fibrillation with digitalis the establishment of the normal mechanism may be overlooked, due to the fact that digitalis has induced so many extrasystoles that the predominant sinus rhythm cannot be distinguished from auricular fibrillation which is considered to still be present. The inadvisability of continuing digitalis medication is obvious. At times an electrocardiogram may aid in the management of a cardiac neurosis by helping to convince the patient that the heart is functionally and organically sound. As indicated above, it is an important aid in following the progress of a patient who has had a recent coronary occlusion.

While the electrocardiogram is of great clinical value it cannot replace the customary methods of history taking, percussion, auscultation, and roentgenology in diagnosis, prognosis, and therapy. It should be used as an adjunct to these clinical methods. There is a definite tendency to depend unduly upon graphic methods; a tendency to "read" too much into the interpretation of an electrocardiogram.

It is well to remember that a perfectly normal electrocardiogram may be obtained in the presence of serious heart disease whereas extensive graphic alterations may be recorded without extensive myocardial changes being present.

SUMMARY

The type of patient who should receive the benefits of electrocardiographic study is the one:

1. With sudden onset of substernal, precordial, or upper abdominal pain.
2. With an irregular or intermittent pulse.
3. With coronary occlusion. The clinician can follow the progress of the patient better with a series of electrocardiograms than in any other way.
4. With a pulsrate persistently under 50 or over 100 per minute.
5. Undergoing digitalis medication. Also useful with other cardiac drugs.
6. Past 50 years of age with symptoms referable to the heart.
7. Who is a prospective mother, the integrity of whose heart has been questioned.
8. Contemplating major surgery, in whom the integrity of the heart is questionable.
9. In whom a full and complete appraisal of the heart is necessary. It is of great assistance in rating certain insurance risks.
10. With a cardiac neurosis, to distinguish functional from organic heart disease and to convince the patient that his heart is normal.

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PEPTIC ULCER IN CHILDHOOD REPORT OF A CASE

JAMES B. GILLESPIE, M. D., and
CESARE GIANTURCO, M. D.
URBANA, ILLINOIS

Ulcers, both single and multiple, may occur in the stomachs and duodenums of children of all ages. Sturtevant and Shapiro[1] found five cases of gastric ulcer in children in 7,219 necropsies. From 1906 to 1925 in 8,360 peptic ulcers

at the Mayo Clinic, Proctor[2] discovered only three in children. Two were duodenal ulcers, and one was gastric. He analyzed the literature and accepted only nineteen cases in children. Sixteen were in girls, and three were in boys; three were duodenal, and sixteen gastric. Schmidt[3] found seventeen peptic ulcers in 2,715 postmortem examinations on children in the second year of life or older. Berglund,[4] in an analysis of the records of 1,323 necropsies done on children up to 13 years of age in the hospitals of Stockholm, found fourteen duodenal ulcers, four gastric ulcers, and one combined duodenal and gastric ulcer. Seventy per cent. of these children were in the first year of life. Foshee[5] summarized all the cases of gastric ulcer reported until the year

Fig. I. X-ray taken June 27, 1934, showing the deformity of the duodenal cap.

1932, and, with his own, there were thirteen. The age range was from 3 months to 14 years, and the average age was 10 years.

Kennedy[6] has classified the ulcers in children in rather distinct groups. First there is the ulcer of the newborn with its associated melena neonatorum. The lesion is acute and is a frequent cause of death in the infant who dies during the first few days after birth following the passage of bloody stools. Death may be due to hemorrhage or peritonitis; at times rapid healing of the ulcer occurs.

A second group of acute ulcers occurs in infants from a few weeks of age to the end of the first year. A third group occurs among children aged 1 to 9 years. These are chronic lesions, but the signs and symptoms so characteristic of the condition in adults are rarely present, and hence the diagnosis is most often made at necropsy or at operation. After 10 years of age the peptic ulcer usually assumes the characteristics by which it is identified in the adult. Kennedy reports six cases of chronic duodenal ulcer, two of which were particularly interesting because the histories and roentgenologic appearances were characteristic. He believes roentgenological examination is the most dependable single procedure in diagnosis of ulcers in children.

Black, Bronstein, and Serby[7] reported five cases in patients whose ages were between 5 and 13 years. In four of these diagnosis was confirmed by roentgenologic examination. The youngest child, aged 5, had had symptoms only one month. Proctor feels that as a criterion for chronic ulcers the symptoms must be of two months duration or longer, and there should be sufficient pathological change in the way of induration, fibrosis, and callus formation to constitute actual chronicity.

The etiology of peptic ulcer is a disputed point. This phase will not be discussed in this paper. It is probable that many of the factors playing a role in the etiology of ulcers in adults function in the same way in children.

Palmer[8] performed a gastroenterostomy on a 6 months old infant with a duodenal ulcer. Miller and Gage[9] obtained by gastroenterostomy relief for at least twenty-one years in a chronic duodenal ulcer in a 7-year-old girl. Holt and Howland[10] advocate symptomatic treatment because of the uncertainty of diagnosis, and they consider surgery rarely justifiable.

We are reporting this case of duodenal ulcer because of several unusual features. The patient was one of the youngest we have found reported with ulcer of the chronic type. It is rare to obtain so typical an ulcer history as she gave, and roentgenologically there was characteristic deformity of the duodenal cap and associated cardiospasm. Cardiospasm was not mentioned in the reported cases, although Bode[11] has considered the possible relationship of ulcer to pylorospasm in infants.

The patient was a girl 4 years of age. She was first seen June 22, 1934, and was the oldest of the three children in the family. The father and mother were alive and well, and the family history was essentially nega-

tive. The patient had had none of the contagious diseases of childhood. She had broncho pneumonia at 10 months of age.

She was a full term baby, delivered normally, and weighed 6¾ pounds. Breast feedings were used the first 10 months, cereal was added at 6 months, and vegetables at 10 months. As a baby she was very constipated. Since 4 months of age she had had periodic attacks of vomiting with no fever and apparently little pain. At 19 months of age she had an attack of severe vomiting and diarrhea without fever which lasted approximately one month. The attacks of vomiting came on suddenly without preceding illness and lasted a few days to several weeks. During the first year and one-half of life the vomiting occurred as a rule immediately after eating.

As she became older she complained of abdominal discomfort. The pain usually came at night and would awaken her from sleep, but at times before meals, or sometimes after eating. It was relieved many times by ingestion of soda, but never by emesis. The administration of milk was not tried, but other foods gave very little relief. The abdominal discomfort would occur with and without vomiting. Attacks of vomiting would last from several days to two or three weeks, and there was rarely an interval of more than a few days between attacks. At no time was there gross blood in the vomitus or stools. She had never been able to eat meat, crackers, or other rough dry foods. She had always been underweight, very nervous, and irritable. She had nocturnal enuresis.

The child on examination was undernourished and pale. Her weight was 27½ pounds, normal weight being 38 pounds. Pulse was 128, and rectal temperature 100. There was bad dental caries present. The tonsils were medium size and infected. The cervical glands were a little enlarged. The heart and lungs were negative. There was no abdominal tenderness. The liver, spleen, and kidneys were not palpable. Urinalysis was negative. Hemoglobin was 60%, erythrocytes 3,610,000, leucocytes 8,800 of which 38.5% were lymphocytes, 6% large monocytes, and 55.5% neutrophiles. The Guaiac test for blood in the stools was positive after the patient had been on a meat free diet one week. Gastric analysis showed 16% free hydrochloric acid and 29% total acidity. The Mantoux test with 1/10 mg. of old tuberculin was negative. The blood Wassermann was negative. Roentgenological examinations of the chest, colon, and gall bladder were negative. Fluoroscopic and x-ray studies of the stomach and duodenum on two different occasions showed typical ulcer deformity of the duodenal cap and cardiospasm. The patient was placed on a modified Sippy diet. One and one-half ounces of milk and cream were taken hourly; two and one-half grains of soda bicarbonate, and two and one-half grains of calcium carbonate were administered hourly on the half hour. There were added small doses of Elixir Luminal and atropin. Improvement was immediate. After one week she was placed on a bland diet with milk and cream between meals. She gained one pound in the first two and one-half weeks of treatment, and, for the first time that the parents could remember, she made no complaint of abdominal discomfort. Roentgenologic studies were made of the stomach and duodenum again four weeks after diagnosis was made. The cardiospasm was less marked, but duodenal deformity persisted. Further observation will be necessary to determine whether medical treatment will be entirely effectual. Figure I shows the duodenal cap deformity noted at the time of the first examination.

On the whole a peptic ulcer in childhood is a rarely diagnosed condition. It is probable that the most important thing in diagnosis is to remember that chronic peptic ulcer does occur in childhood. Pain, vomiting, and obstinate constipation are the most frequent symptoms. Bleeding of some extent occurs in about forty per cent. of cases, and the stools may be positive for occult blood. A frail, slender, undernourished child with recurring gastric discomfort, vomiting and constipation should lead one to suspect peptic ulcer. Retardation of development is common. A complaint of abdominal pain particularly at night, or sometimes after meals, and relieved by emesis, the ingestion of milk or soda, should be indication for roentgenological examination of the stomach and duodenum by a competent roentgenologist. However, the history of peptic ulcer in childhood is rarely obvious, and roentgenological examination of the stomach and duodenum is justified in cases of obscure epigastric discomfort. Perforation is not uncommon. Children probably respond better than adults to medical treatment. It is of little value, however, in the calloused, penetrating, perforating, and obstructing ulcer. Such patients are suitable for surgery. Complications requiring surgical procedures are probably treated in the same manner as the condition would be treated in the adult patient. Removal of foci of infection should be a rational procedure.

As has been said, the x-ray is probably the most significant factor in diagnosis. The use of x-ray diagnosis in ulcers of infancy is a comparatively recent acquisition. Thiele,[12] in reviewing twenty-two cases in 1919, did not mention any case in which the diagnosis was established radiologically. The Roentgen diagnosis of ulcer in children does not differ in any way with the Roentgen diagnosis in adults, and, therefore, does not offer any more difficulties. The high percentage of positive cases reported is very encouraging and should induce a stricter collaboration

between the pediatrician and the roentgenologist.

Carle Hospital Clinic

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THE MODERN CONCEPT OF ACUTE INTESTINAL OBSTRUCTION

CARL G. ROBERTS, M. D.

CHICAGO

An enormous amount of research has adduced considerable information and resulted in marked modification of the previous concepts of intestinal obstruction, its pathogenesis, the chemical changes involved, and the toxic factors responsible for its rapidly fatal course. Haden and Orr, Whippel, Draper, McCallum, McIver, Dragstedt, Bayliss, Starling and numerous others, have done much to enrich the literature upon this subject and to formulate hypotheses upon which to base rational conclusions and treatment.

As a result of the work in this field, we have learned the vital importance of conserving the body fluids and replacing the loss of gastrointestinal juices with appropriate substitutes. It is now known that instead of toxicity being the factor of principal importance, dehydration, with the resulting changes in the blood chemistry, deserves equal if not greater primary consideration.

Under modern concepts the following can be accepted as physiological premises upon which to base conclusions:

(a) The normal amount of gastric, pancreatic, biliary and intestinal secretion in twenty-four hours, is more than the total quantity of blood and lymph in the body combined. In adults the total quantity passing through the upper gastrointestinal tract for reabsorption in the lower bowel averages from five to seven liters daily. (McIver[1])

(b) Fluid enters the lumen of the gastrointestinal tract by way of the mucosa even though none is taken by mouth.

(c) Water and inorganic salts are not absorbed in the stomach, duodenum and jejunum, but must be carried by peristalsis to the lower ileum and colon for reabsorption.

(d) A continued loss of gastric juice results in the depletion of the blood chlorides, increase in the bicarbonate, the CO_2 combining power, the Ph and the N P N; in other words, changes incidental to an alkalosis.

Continued loss of the upper intestinal secretions, pancreatic juice and bile, with the resultant decrease in sodium, produces changes in the blood chemistry characteristic of acidosis, i. e., reduction of the CO_2 combining power, decrease in the Ph and increase in the N P N. The important etiological factor involved in these changes seems to be the loss of sodium or chloride ions. The presence of these electrolytes in their usual proportion is essential to retention of ingested water and prevention of dehydration. (Gamble and McIver[2])

Experimental research has demonstrated the presence of a toxin in acute obstruction which is unaffected by boiling and against which immunization is of no avail. Upon injection the action of this toxin is similar to that of histamine; producing a fall in blood pressure, acting as a secretagogue upon the saliva, succus entericus, gastric and pancreatic juices; and causing a fall in the blood chlorides with increase in the N P N and the urea nitrogen. (Dragstedt[3])

It has been found that the normal intestine tolerates many times the toxic dose of this substance without harmful results. This may be due to the power of selective absorption possessed by the normal intestinal mucosa, acting as a protective mechanism. Obstruction causes distention, resulting in interference with intramural and mesenteric circulation; damaging the intestinal mucosa and causing it to lose its power of selective absorption; thus permitting these toxic substances to reach the blood stream.

If these premises and their correlated theories are true, we are warranted in believing

there are two principal factors in the causation of death from intestinal obstruction.

First: Changes in the blood chemistry, as a result of continued vomiting with a loss of the gastric and upper intestinal secretions, ending in alkalosis and dehydration.

Second: Distention causing circulatory and mucosal damage; thus permitting the absorption of a powerful toxin whose exact composition and nature is still undetermined, but one that is comparatively harmless to a normal intestinal mucosa.

Twisting and segmentation of the intestine does not usually occur in the earlier stages of obstruction, but after there is considerable distention or in the presence of peritonitis. This segmentation is not only due to the short mesenteric attachment of the ileum, but may also be a result of a distended intestine with intermittent peristaltic action endeavoring to accommodate itself to the limitations of the abdominal cavity. This results in the ladder-like formation of intestinal loops with fluid levels so graphically depicted by roentgenograms. In the earlier stages there are often gas filled loops with no perceptible segmentation or agglutination.

According to Wangensteen,[4] the experimental laboratory has demonstrated that definite roentgenographic evidence of a single plate may be obtained three or four hours after the beginning of obstruction. Valuable information is given in the prone or supine position, both as to the degree of distention and location of the distended coils. The step-ladder arrangement occurs later and is not necessary to make a diagnosis.

It would be trite indeed to discuss the importance of relieving the cause of obstruction. Observation of this fundamental rule takes precedence over every other measure and the discussion of the adjunct procedures hereinafter mentioned is not to be construed as reflecting in any way upon this sine qua non of the treatment of these cases. There are many instances, however, where it is necessary to use temporary palliative measures; in conditions too critical to permit more extensive procedures, or as adjuncts to the major operation offering an additional margin of safety.

Based upon the preceding premises it would seem that the principal indications for treatment aside from relieving the actual obstruction are:

(a) Replacement of the lost fluids containing the essential electrolytes of inorganic salts and other organic substances.

(b) To decompress the bowel by relieving distention; thus restoring the circulation and preventing the loss of fluids by vomiting.

Inasmuch as there is loss of both gastric and upper intestinal secretions, there is also a varying depletion of blood chlorides even in the presence of a marked decrease in volume. Following the discovery that Ringer's solution and normal saline were of great value in replacing the chlorides and prolonging life, Hartmann perfected a formula which is said to be effective in either alkalosis or acidosis. (Elman.[5]) It contains sodium chloride 11.7 per cent., sodium lactate 5.6 per cent., calcium chloride 0.54 per cent., potassium chloride 0.74 per cent.; the sodium chloride being utilized by the tissues in alkalosis while in acidosis the lactate is converted into the needed bicarbonate. This solution has proven extremely valuable in the presence of dehydration with either alkalosis or acidosis.

Hartwell and Hoguet[6] demonstrated the fact that dogs with high intestinal obstruction will live several weeks longer if given large quantities of salt solution. This experimental work was confirmed by Haden and Orr[7] and as a result of their investigation the replacement of the chlorides by introducing normal saline or Ringer's solution, has been accepted as a routine measure in the treatment of ileus.

Decompression. In addition to relieving the obstruction whenever conditions permit, other measures have been advocated for decompression of the bowel and maintenance of the acid base balance. Enterostomy, accompanied by the parenteral replacement of lost fluids and inorganic salts, has been used for years as an adjunct to the principal operation or as a preliminary palliative measure. Inasmuch as the obstructed intestine tends to rotate and twist on its longitudinal axis frequently producing segmentation, or when there is complete intestinal paralysis from generalizing peritonitis, enterostomy sometimes fails in its purpose.

High jejunostomy has been advocated by Heidenhain,[8] Lee and Downs,[9] and others, as preferable to simple low enterostomy on the basis that the most virulent toxic material is found in the jejunum and its drainage is more certain.

Haden and Orr[10] found experimentally that it was necessary to use sodium chloride as an adjunct to jejunostomy to prevent untoward results.

Decompression by vacuum suction, such as is used with the Wangensteen apparatus, meets one of the principal indications for treatment by relieving the distention which is the cause of the circulatory and mucosal damage. It gives the patient all of the benefits of a jejunostomy without the disadvantages involved in establishing a fistulous opening with uncontrollable loss of upper intestinal juices and it involves no additional danger of surgical shock. The rapidity with which distention disappears is remarkable, especially if there is no segmention of the ileum. It must be watched, however, to prevent the development of dehydration due to rapid depletion of the body fluids without replacement by efficient substitutes in adequate quantity. This danger is obviated by the use of glucose intravenously and the reintroduction of the aspirated intestinal fluids as proctoclysters.

If jejunostomy is more effective than enterostomy in the absence of segmentation, why isn't it possible to obtain equal or better results in selected cases by passing a Levine tube intranasally through the stomach into the duodenum without performing a jejunostomy? Wangensteen,[4] and Vander Veer[11] report excellent results from transduodenal decompression in suitable cases of acute mechanical ileus. Wangensteen found that it was seldom necessary in adhesive obstruction to perform a second operation to release the constricting agent after performing enterostomy. This is also true of decompression with the nasal catheter. Vander Veer uses transduodenal decompression and siphonage in preference to jejunostomy. Other reports are rapidly appearing in the literature testifying to the favorable results in selected usage and to the many advantages of this method over routine enterostomy.

During the last two years, I have used transduodenal decompression with a nasal catheter combined with reintroduction of the aspirated gastrointestinal contents by proctoclysis, in some selected cases of acute ileus. The results have been promising and the mortality rate lower than in those cases treated without using these measures. In two or three instances, where the critical condition of the patient contraindicated all surgical procedures, this method of treatment resulted in such rapid and marked improvement that further interference to hasten recovery was unnecessary. All of the cases were provisionally classified in the adhesive type, as this is the one affording the best indications for the use of decompression.

Reintroduction of Gastrointestinal Juices. The reintroduction by proctoclysis of the aspirated gastrointestinal juices supplies the minerals and their electrolytes which are so essential to tissue metabolism. This meets the second indication for treatment by preventing the change in the blood chemistry that follows the loss of the chlorides and other mineral salts. The factor of toxicity is a negligible one as was proven in the experiments of Elman, Dragstedt and others. Elman introduced a liter of intestinal contents containing trypsin, peptones, phenols, amines and other substances together with gas bacilli into the gastrointestinal tract without any harmful results. The selective absorptive ability of the normal intestinal mucosa neutralizes any possible harmful effects from toxins present in the aspirated fluids when they are introduced as proctoclysters.

There are many instances in which the physician is confronted by conditions too critical to permit surgical procedures without grave danger to the patient, or when surgery has been refused and he is forced to rely on palliative measures alone. There are now at his command, nonsurgical methods which may lead to recovery in the adhesive type and which are of considerable value as adjuncts to the treatment of any type of acute ileus.

152 West Division Street.

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TREATMENT OF WHOOPING COUGH WITH PROPHYLACTIC PERTUSSIS VACCINE (SAUER)

MEYER M. MARBEL, M. D.
CHICAGO

Common observation dictates and lends itself to the idea that whooping cough infection will run a harsher course and with greater complications in some families than in others. This perhaps is due to a lowered resistance or a greater allergic reaction to the toxin of the given germ produced in the bronchial tree or quantitively a greater degree of infection in a given family.

It is, therefore, of paramount importance to resort to a more effective means of treatment in the severer forms of cases of the whooping cough infection, not only for the purpose of prevention of unpleasant complications but at times even to safeguard against possible death arising from such complications. The following two cases are suggestive of severer forms and the variation in their treatment.

Case 1, Patient T. K., male, seven years old, contracted whooping cough ten days ago with very frequent spells of coughing, long whoop and violent vomiting. Hemorrhages from the nose, mouth and eyes followed each vomiting spell. Patient could not retain any food and would throw-up every time he would take a drink of water so that loss of weight, dehydration and exhaustion were quite prominent symptoms. The conjunctiva of both eyes was blood-shot, eye grounds showed petechial hemorrhages. Umbilical hernia was getting more pronounced, left ear drum showed a ragged perforation.

Patient's mother also gives a history that a younger brother of this patient died of whooping cough on the fourth week of the attack and his older sister during whooping cough developed a pneumonia that confined the patient to bed in hospital for six weeks.

Oral medication like syrup, tribromide of gold, 50% paregoric, luminal, codein, belladonna, etc., seemed of no avail. Therefore ether in olive oil, 1-drachm to the ounce, (4 cc to 30 cc) rectally, five inches high in a knee-chest position for half an hour was tried twice daily, then thrice daily and sometimes even four times a day with very good results. Approximately from 70% to 80% of the coughing spells were under control. As this form of treatment necessitated treatment for several weeks, a more thorough agent was looked for. The prophylactic whooping cough vaccine (Sauer), Lilly & Co. was tried for curative purposes. Instead of using it once a week, it was administered daily, 1 cc into both arms, next day 1 cc into each leg; third day 1 cc into each arm; 4th day 1 cc into each leg.

At the end of the fourth day all symptoms have completely disappeared. Nose bleeding checked, coughing spells completely disappeared, eyes cleared, meals and water retained. Patient ate heartily, drank water plentifully, gained in weight. From this day on and for the following five weeks, the patient has not coughed a single time, has not even expectorated in the morning.

Case 2, J. K., four-year old boy, with a severe form of whooping cough. He was the only child of his mother. His four brothers died of whooping cough and his mother anticipated a like fate for this child. Straight ether injections 1 cc into arm once a day or every other day gave better results in the control of the coughing spells, one could term it ninety or 95% results and was more effective than ether and olive oil rectally, but had to be discontinued because a few days after each injection a clean punched-out like ulcer in the arm would result on the 3rd or 4th day and therefore ether and olive oil rectally had to be resorted to. This treatment was kept up for 7 or 8 weeks with fairly good results; patient made fairly good recovery at the end of eight weeks.

The prophylactic whooping cough vaccine (Sauer), Lilly & Co. has not been used in this case.

Conclusion: In the severer form of whooping cough cases prompt cessation of all symptoms and all coughing spells were observed when the prophylactic whooping cough vaccine (Sauer) Lilly & Co., was used for curative purposes. In another severe form of a similar case where ether injections intra-muscularly or ether in olive oil rectally were used, the symptoms were only abated from 60% to 90%. The treatment has to be kept up daily throughout the entire period of this self-limiting infection of whooping cough. In both cases oral medication has failed completely.

N. B.—14 cases of whooping cough with moderate severity of infection have given uniform results with the Pertussis Vaccine (Sauer) Lilly & Co. in a similar manner, as in case 1.

5 cases of whooping cough with as great severity, as described in above 2 cases, have yielded to the same treatment with as dramatic results, as in case No. 1, even though treatment was tried on 3d and 4th weeks since the first day of infection.

NON-DIPHTHERITIC MEMBRANOUS INFECTIONS OF THE LOWER RESPIRATORY TRACT IN CHILDREN

WALTER M. WHITAKER, M. D., F. A. A. P.
and
WALTER STEVENSON, M. D.
QUINCY, ILL.

During the past few months it has been our privilege to see several children exhibiting a clinical picture of an acute fulminating laryngotracheobronchitis. The clinical manifestations and course of this illness have been so striking, and any outline of treatment so limited in its benefits, plus a very high mortality rate, that we have felt this matter worthy of more general interest and consideration. No doubt, every member here is familiar with the type of case to be presented.

In presuming a suitable title for these cases, the term "membranous," was chosen, realizing that in many of these cases no true membrane exists on direct examination of the larynx, but usually a psuedomembrane or a sticky exudate is present in the larynx and trachea which acts to produce the same obstructive symptoms as a true membrane.

In order to successfully arrive at a proper and satisfactory outcome in the treatment of any illness of the respiratory tract with obstructive symptoms, the clinician must be able to arrive at a correct diagnosis in order that he may provide proper treatment for the given case. In most of the membranous conditions involving the lower respiratory passages in children, the physican usually has time to ascertain the nature of the illness and is consequently better able to carry out a satisfactory plan of treatment. There are three common outstanding conditions in children which give rise to symptoms of lower respiratory obstruction, namely diphtheritic infections, foreign bodies, and acute infectious laryngitis. It is not our purpose in this paper to discuss the first two conditions because we feel that they are fields with which all of us are more or less familiar. Acute infectious laryngitis with extension into the trachea and bronchi, has certain important aspects about it concerning which not much has been written, and it is our purpose to present the clinical picture obtained in that condition.

For many years diphtheria was blamed for most all cases of laryngeal dyspnea of infectious origin. Gittens,[1] in 1926, stressed the importance of many such cases being of a non-diphtheritic nature and carrying a much higher mortality rate than the usual case of laryngeal diphtheria.

He also stressed the point that these cases were not new and rare but that many of the non-diphtheritic cases were being handled as diphtheria and classified as such in mortality and health statistics. Our main reason for calling attention to these cases at this time is because we feel that they occur often and are associated with a mortality rate sufficiently high to cause stimulation of interest among the profession, whereby means or ideas may be advanced to combat this grave condition.

That this clinical picture is not new is evidenced by reports in the literature relating to similar cases. McNab,[2] in 1915, reported one of these cases with similar clinical findings and a positive streptococcic culture from trachea. Lewis,[3] in 1918, spoke of "Streptococcal Infections Simulating Diphtheria." Jackson,[4] in 1921, reported a similar condition under the heading of, "Infective Tracheo-Bronchitis." Purcell,[5] in 1921, wrote of, "Membranous Obstruction of the Bronchi, Clinically Diphtheria, Removal with Bronchoscope, Recovery." Gittens, in 1926, presented fourteen cases of non-diphtheritic membranous laryngitis and tracheobronchitis before the American Laryngological, Rhinological, and Otological Society. The same author[6] reviewed the course and treatment in 24 cases seen since 1920 in a paper before the American Laryngological, Rhinological and Otological Society in 1932. Harry L. Baum,[7] of Denver, has discussed 24 similar cases under the heading of, "Acute Laryngotracheobronchitis." He felt that the obstruction was usually subglottic and due to inflammatory swelling and not to membrane, although he remarks about the presence of a pseudomembrane in some cases and sticky secretions of glue-like consistency being present in all cases. It is this secretion or exudate, plus accompanying inflammatory swelling in the larynx and trachea, which we consider as a potential membrane. The latest article to appear

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on the subject is one by Lyman Richards[8] of Boston under the heading of "Fulminating Laryngotracheobronchitis," in which his experiences in 11 cases at the Children's Hospital in Boston during the past few years are given. We must conclude that the literature on this subject is becoming more voluminous as these cases are recognized as a definite clinical entity apart from diphtheria.

The Clinical Picture and Discussion. The condition which we wish to describe to you can be defined as an acute infection of the respiratory tract, characterized by a rather intense febrile reaction, associated with a marked inflammatory change in the mucous membrane and walls of the trachea, bronchi, and bronchioles with the presence of a gummy glue-like exudate which acts as an obstructive agent to the airway. This secretion may extend downward into the terminal bronchioles and thereby produce a bronchial pneumonia.

The onset of the disease in the cases which we have seen is rather typical and uniform, most frequently in children about the ages of two to four years who have been apparently in quite good health. There will occur a slight head cold which may at times go unnoticed and may exist a day or two before the child wakes up at night with the symptoms of a spasmodic croup. The symptoms of croup are the typical ones with which you are familiar, being essentially the usual inspiratory stridor associated with hoarseness and the customary barking cough. The physician, on being summoned, may think of the possibility of a foreign body, but the history of the child having been put to bed apparently well tends to rule out such a possibility. A laryngoscopic examination may, or may not, be made at the time but the usual course of events will be that the patient is treated as if it were a simple case of croup, but to the attending man's amazement, the case does not clear up under such classical treatment, and he then in turn seriously considers the possibility of a diphtheritic infection for which antitoxin is usually immediately administered until cultures can confirm or disprove the diagnosis. Usually by this time, however, the child has grown much more uncomfortable with an increasing amount of dyspnea associated with rather marked substernal and suprasternal retraction. With such an advance and unabatement in symptoms, the physician naturally feels anxious and at this time the child is usually admitted to a hospital. Here attempts are made, if they have not previously been done in the home, to get a direct view of the larynx. By so doing one can definitely be certain as to the presence or absence of membrane or foreign body and also can remove any obstructing secretions which may be present. In the condition which we are describing, the cases were subjected to laryngoscopic examinations by one of us. The arytenoids and false cords showed little reaction of an inflammatory nature, the primary pathology being in the subglottic space. Here in the upper airway, one may find the formation of crusts in the region of the larynx which intensify the obstructive symptoms. After the removal of these crusts, or after the insertion of a tracheotomy tube one may feel that no further obstructive difficulty will arise.

Dyspnea of a serious degree remains the paramount clinical symptom — dyspnea which was not relieved in our cases even after the tracheotomy tube was in place and kept open. Dyspnea in young children and infants is always of serious importance and must be relieved early if life is to be spared. It is very easy to procrastinate in these cases since the dyspnea is usually slowly progressive and blue cyanois may not appear but rather pale cyanosis due to cardiac exhaustion. Waiting for a child to become cyanotic is too dangerous. Any child with obstructive breathing persisting through the day is in grave danger and must be carefully watched and in such circumstances that cannulation can be done at once, particularly if there is no abatement of symptoms associated with marked restlessness, weak pulse, pallor and poor fluid intake. It seems that these symptoms are more apt to develop in the real young child, possibly due to the greater chances for the membranous exudate to develop to the point of seriously embarrassing the air entry. Also there is usually poor development of the cough reflex in small children which tends to add to the likelihood of development of mechanical obstruction. When the full-blown clinical picture of a tracheobronchitis occurs one finds a rise in pulse rate to about 150 with a persistently high respiratory rate even though the upper air passages may be fairly clear. This point cannot be too strongly

emphasized as of diagnostic value for when one finds no abatement of symptoms and the child remains in a restless state, with a tendency to cyanosis even with a tracheotomy tube in place, then one can be firmly convinced that he is dealing with the malignant condition known as nondiphtheritic membranous tracheobronchitis. With a return or continuation of the obstructive symptoms the attending physician is apt to feel that the intubation or tracheotomy tube may itself be occluded. Such, however, is usually not the case although at times the tube may become occluded with portions of the gummy material from the trachea. The point we have to realize, then, when such symptoms persist is that we are dealing with a mechanical obstruction so low down in the airways that no available therapeutic procedures are likely to be of use. The only thing which can offer any possible relief of symptoms at this stage of the process is a bronchoscopy, at which time the mechanical obstruction consisting of thick, tenacious secretion is to be removed. If such procedure cannot conveniently be done, then there is no doubt but that steady asphyxiation will become progressively more evident, and in spite of everything the youngster dies a horrible death due to suffocation. In the cases typical of this condition the most characteristic finding has been the presence of a thick gummy-like secretion in the trachea which tends to form semi-solid plugs of brownish material. There is almost never a true membrane present in the larynx or trachea but the gummy-like secretions act to produce mechanical obstructive symptoms.

It must be said here that innumerable children develop hoarseness and a croupy cough with any respiratory infection but severe dyspnea does not develop, fortunately, in the majority of such cases and recovery is usually rapid. In the described condition, we must remember that we are dealing with a descending infection and not one that remains localized to the larynx proper.

Pathology. As regards the infecting organisms in these cases, it is generally felt that the main offender is the streptococcus. Numerous other organisms, particularly staphylococci or pneumococci, may be found in cultures of the exudate in the subglottic area. Cultures were always taken from the larynx at the time of laryngoscopy and from the trachea at the time of tracheotomy. The main value of any bacteriological study in these cases is its aid in deciding between diphtheria and some form of non-diphtheritic infection. In our own cases the staphylococcus aureus and staphlococcus albus were the usual organisms. Dr. Sydney Farber[9] maintains that these cases are always caused by hemolytic streptococci and such organisms will be found if deep cultures are made, the microscopic findings being typical of an uncomplicated descending streptococcus hemolyticus infection. Superficial cultures may be positive for other organisms, however. Diffuse cellular infiltration and destruction of the walls of the larynx and bronchi was noted. The mucosa was destroyed and covered by fibrin and purulent exudate. The findings in the lungs were confined to a peribronchial reaction and infiltration of the alveolar walls with the formation of a true bronchial pneumonia in several instances.

Treatment. It is the control of the formation of this secretion, plus means to facilitate removal of same from the airway which seems the paramount principle and object of treatment in these cases. Usually after tracheotomy, dyspnea is somewhat relieved, but then one becomes confronted with the task of removing these secretions, an almost endless and a ceaseless job, demanding untiring effort and constant vigil on the part of the attending physicians and nurses. Following the cannulation, extreme dryness of the air passages ensues which acts to further intensify the gummy character of the secretions. At this stage dyspnea begins to increase and pulse and fever to arise. Various means to aid in liquefying the secretions are used, such as adrenalin in five minim doses dropped directly into the tracheotomy tube or weak saline or bicarbonate solution. Lately, Richards has used a sodium perborate solution in the same way. In our cases, adrenalin was used and there does occur a definite increase of secretions with some greater ease in removing the plugs. One feels that he has the airway clear after removing a plug, the child breathing easier and color returning but not many minutes elapse until the nurse hurriedly calls you to repeat the procedure. In our own cases, in spite of such procedure, and day and night vigil, gradual suffocation ensued, since it seemed impossible to maintain a sufficiently clear airway long enough for the child

to regain any recuperative powers. It seems that this so-called "dry-stage," with high fever, rapid pulse, toxemia, and pallor plus the gummy secretions is the most important phase in the entire clinical course, a picture not seen in ordinary diphtheria. No doubt, the major cause of death in these cases results from an ensuing pneumonia secondary to a mechanical atelectasis. In two of our cases, however, positive blood cultures were obtained, so a terminal sepsis may be a factor in death.

To aid in the liquefaction of secretions nothing is probably of more value than high fluid intake, usually only obtainable by intravenous methods.

Valuable time may be lost in treating these patients by x-raying the patient's thymus, or waiting for cultural reports. The larynx should always be examined early and repeatedly if necessary, to determine the progression of pathology. Diphtheria antitoxin may be given before the cultural report is known. Even though no specific action therefrom is expected, a foreign protein reaction may be beneficial. Certainly all infants and young children with dyspnea lasting several hours and throughout the day should be hospitalized for observation. Many of the cases with no fulminating downward extension of the infectious process are relieved by the usual croup tent, steam inhalations and forced fluids. Children with progressive dyspnea, rapid pulse, and pallor progressing to a pale cyanosis with definite play of the extrinsic muscles of respiration should have a tracheotomy done at once. It is felt that tracheotomy is preferable to intubation in these cases because of the presence of an accompanying infection in the tracheobronchial tree as well as in the larynx and because intubation tubes frequently become displaced and require a trained physician at all times to insert them. An intubation tube which has to remain in the larynx for several days may produce damage leading to a later laryngeal stenosis. However, Baum[7] has allowed the tube to remain in many cases for a period of three weeks without any after effects. A properly done tracheotomy will cause no stenosis later. The presence of the thick tenacious membrane in the non-diphtheritic cases requires frequent removal which would be almost impossible via the intubation tube. The tracheotomy tubes form a means of easy access for bronchoscopic work, if required. Streptococcus serum has been advocated in these cases, as well as immune blood but no significant effects have been noted following the use of either procedure.

Prognosis and Mortality. The prognosis in these cases seem to be highly dependent upon the age of the child. Most of the serious cases seem to occur under three years. Those cases which are seen early and the true condition recognized, may possibly be saved by tracheotomy and means to keep the airway clear and the plugs removed. In our own cases even such measures were of no avail. This exceedingly poor outcome for recovery is in keeping with the opinion of Richards[10] of Boston. In addressing the section on Pediatrics at the annual meeting of Massachusetts Medical Society in 1932, he spoke on the question, "Can Fulminating Tracheobronchitis Be Cured," and concluded that children presenting this clinical syndrome of a descending Streptococcus infection of the respiratory tract invariably died. He managed to keep one child alive for 57 days, the child then dying when apparently recovering satisfactorily. Autopsy revealed the respiratory infection as having subsided. Richards reported four cases recovering by intubation but admits that these cases were of a much milder degree and probably did not belong in the category of the acute fulminating membranous variety. Since the purpose of either an intubation tube or a tracheotomy is to relieve laryngeal obstruction it is easy to see how unsuccessful either procedure may be in cases with descending infection evident. Richards[8] in a later report noted that all his cases treated by tracheotomy or tracheotomy with intubation tube died and concluded that in the present state of our therapeutic armamentarium that prognosis was almost hopeless for these cases. Gittens'[6] mortality figures are somewhat better. In 24 cases which he has seen since 1920, 15 of which required tracheotomy, there were 8 deaths giving a mortality rate of 53%. His mortality rate has remained high in spite of early recognition and treatment as previously outlined. In this same period of years, Gittens saw 17 cases of true laryngeal diphtheria, 16 of which required tracheotomy with a mortality rate of 37%. Johnson[11] reported 3 cases, all under 3 years,

all of whom recovered, with decannulation being possible within 12 days. Unfortunately, we were unable to substantiate such good results in our small series of cases.

CASE REPORTS

The following cases are reported as illustrating the more important points already referred to in the paper. Brevity is used as only the essentials can be mentioned in the time allowed.

Case 1. A boy, R. W., one year of age, was admitted to the Children's Division of St. Mary's Hospital on December 21, 1933 with the history of a croupy cough and some inspiratory stridor of three days' duration. The stridor did not persist in the daytime for the first two days of the illness but the day before admission, it had remained audible all day. Temperature reached only 99-100 degrees and general physical examination was negative except for slight redness of the pharynx. The child was immune to diphtheria. There was no improvement by the usual outlined treatment of steam inhalation, expectorants, and anti-spasmodics. A direct laryngoscopy was done which revealed no membrane, but definite subglottic edema with a fiery red appearance of the upper trachea. The cords were not involved. There was some rather grayish-yellow exudate present in the upper trachea. Cultures and smears taken were negative for diphtheria. Previous treatment was continued, and the next morning another laryngoscopic revealed more evidence of obstruction and the child was showing now, definite suprasternal and infrasternal retraction. Hospitalization was done and in view of the persistent stridor, narrowing airway and restlessness with pallor and increasing pulse rate, a tracheotomy was done about three hours after admission. The child was not exhausted by any means when the operation was done. Twenty thousand units of diphtheria antitoxin was given intramuscularly while on the operating table. Following tracheotomy the stridor disappeared but dyspnea remained with rapid pulse and a rise in temperature to 104 degrees rectally. We then realized we were dealing with a clinical picture with which neither of us was familiar. Very shortly thereafter, tenacious, sticky, gummy mucus began to occlude the cannula requiring constant vigil and suction to remove the plugs. Humidifiers were kept active in the room at all times. Intravenous glucose was given twice during twenty-four hours and subcutaneous glucose 3% in Hartmann's solution. Adrenalin 1: 1000 sol. min. 4 with normal saline min. 4 was frequently injected into the cannula with syrup of ferrous iodide by mouth. Frequent occlusions of the airway continued to occur inducing marked restlessness and increased pulse rate and pallor. On the third hospital day marked paleness had developed and the laboratory reported 4,070,000 RBC with 53% Hb. 16,000 WBC with 54% polys, 12 staff, 42 segmented, 42 lymphos. A transfusion of 125 c.c. citrated blood was given and a blood culture taken which subsequently showed a pure bacillus pyocyaneous growth. The predominating organism in the smears from the larynx were staphylococcus aureus. Urine examination was negative except for one plus albumin. The evening of the third hospital day, the air entry to the right lung seemed diminished and an x-ray of the chest showed a possible atelectasis or pneumonia of the right upper lobe. At this time we realized it was almost futile to attempt to keep the upper trachea open, when plugging has occurred lower down below the reach of our suction catheter. In an effort to remove such mechanical plugs, three bronchoscopic examinations were made via the tracheotomy wound and by suction several plugs were removed with temporary improvement. The tracheobronchial tree was lined with this gummy exudate as far as one could see, hanging in spicules from the mucosal walls. Subsequently, in spite of further removal of plugs the child became more pallid, breathing more difficult, (but with less use of the extrinsic muscles) and death ensued from apparent suffocation due to mechanical obstruction of bronchioles, after a fatal illness of 7 days. After spending some 50 or more continuous hours on this case and then losing it, we were highly respectful of this clinical entity.

This case is unusual from the types described by other writers in that a Bacillus pyocaneus was cultured from the blood stream. In the extensive reports by Gittins, Richards, and Baum, no mention is made of blood culture studies. It is probable that in many of these cases we are dealing with an overwhelming sepsis.

The virulence of Bacillus pyocyaneous in young children has been stressed by Epstein and Grossman.[13] It is well known that this organism is particularly prone to attack the skin and mucous membranes. In this case, one can only speculate as to the portal of entry, but we feel that the most likely place was about the tracheotomy wound but, unfortunately, no cultures were made from that area. None of the characteristic gangrenous lesions about the anorectal and genital regions were observed, but probably death ensued too early for their development. In view of this complication rarely occurring it would probably be wise to frequently apply 1% acetic acid to the region of the tracheotomy wound in conjunction with the other usual aseptic precautions.

Case 2. A female child, L. Y., aged four months, entered the Children's Division at St. Mary's Hospital on March 2, 1934. One week before admission the mother was awakened suddenly about midnight by the noisy, crowing, breathing of the child with retraction of the suprasternal notch and lower intercostal spaces. The stridor remained present, day and night and at about the same intensity for about a week. The diagnosis of thymic hypertrophy had been made elsewhere before we saw the child. The voice was not affected and cyanosis was not evident. There had been a relatively low temperature but at admission the temperature was 102 degrees rectally with a pulse of 160 and a respiratory rate of 40. Immediate laryngoscopy was done, revealing a subglottic edema and mucopurulent discharge from below the glottis. The RBC were 4,500,000 with 15,000 WBC. Blood calcium was 12.4 mgm per 100 c.c. serum.

Smears from the larynx were negative for KLB and staphylococcus albus was the predominating organ-

ism. In view of the obstructive symptoms becoming unrelieved, tracheotomy was done about ten hours after admission, under local anesthesia. Following the operation, the pulse remained at 160-170 and respiration rose to 60-70 with the temperature remaining about 102 degrees. We felt we might not be dealing with one of these fulminating cases until about the third postoperative day typical plugging began to occur, demanding suction to keep open the airways. Signs of bronchospasm developed over both bases. The temperature rose to 106 for two days and the child died a similar suffocative death to case 1. Blood culture taken before death revealed a positive growth for staphylococcus albus. Transfusions and intravenous glucose were also given in the case along with steam inhalations, and adrenalin via cannula and constant humidifiers in the room. Autopsy was not permitted.

Case 3. A boy about five years of age became suddenly ill with croup following a slight upper respiratory infection. The stridor persisted through the day. The child was brought to Blessing Hospital where it was seen in consultation by one of us. Direct laryngoscopic examination revealed subglottic swelling with a brownish tenacious material coming from the trachea. Tracheotomy was done one hour after admission and the child seemed satisfactory. A few hours later, obstructive symptoms developed, being relieved at times, by the therapy. The child was put in an oxygen tent. Death occurred 48 hours after admission to hospital.

Case 4. Boy, aged 3½ years, entered Children's Division at St. Mary's Hospital on February 23, 1934 and was discharged on February 27, 1934. History of sudden onset of stridor, croupy cough persisting through the day, with fever of 104 degrees at onset. Child was immune to diphtheria. Examination was negative except for stridor and slight suprasternal retraction. Child was hospitalized and direct laryngoscopic examination revealed deeply injected cords, no supra or infra-glottic edema, but a moderate amount of purulent discharge coming from the glottis. Smears coming from larynx were negative for KLB and positive for streptococcus, pneumococcus and staphylococcus. This boy was given conservative treatment and closely watched, because we felt he might develop into the fulminating type but he recovered in three days and was sent home well.

This case was included because we feel it is the common type of catarrhal laryngitis, frequently observed, yet the symptoms at the start are similar to those which develop in the true fulminating, membranous cases. This is the type of case which gets well, while those developing descending symptoms are highly fatal. This case would also have recovered with intubation, had that procedure been necessary. Numerous other cases of non-diptheritic laryngeal obstruction have been seen this past winter, all of which recovered but in many of whom we were fearful that the fulminating, membraneous form might develop.

Case 5. A number of years ago a child 2½ years of age came into the hospital with the history of having aspirated a kernel of corn which could not be located by ordinary bronchoscopy and a low tracheotomy was done because of impending suffocation. As soon as the trachea was opened the kernel of corn was recovered without bronchoscopy. The progress of the case was uneventful until the following day when a condition typical of the disease described heretofore developed. The tracheal wound was reopened and with the utmost difficulty we were able to keep the tracheobronchial tree clear of viscid, tenacious, glue-like exudate. Forty-eight hours after entrance into the hospital the child died as a result of sepsis, cardiac exhaustion and almost complete obstruction of the lower respiratory tract. Attention is called to the case because of the fact that the disease was unquestionably secondary to the induction of a foreign body. A similar case in a slightly older child following the removal of a watermelon seed, has been observed with recovery.

SUMMARY

A group of highly fatal cases characterized by a descending infection of the lower respiratory tract, of non-diphtheritic origin is presented. Present therapy seems almost futile to save these children. A plea for the early recognition of this entity is made, so that those cases will not be considered diphtheritic in origin, and thereby, valuable time lost in instituting proper treatment, if in the present state of our knowledge, we can say that instituted treatment is of any avail in restoring health. The authors concur with Dr. Richards in believing that fulminating tracheobronchitis is almost invariably fatal. Direct laryngoscopic examination is invaluable in aiding in the differential diagnosis of this condition.

By early recognition of these conditions, with early relief of laryngeal obstruction, followed by mechanical removal of the exudate in the lower respiratory tract, it may be possible to save a percentage of these cases before pneumonia or plugging of the bronchi results or sepsis ensues. Possibly further bacteriological studies with development of a specific serum will aid in combating this dreadful disease.

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DISCUSSION

Dr. Walter Stevenson, Quincy: It has been my misfortune to see a number of these cases in some of which I am sure the true nature of the disease was not recognized. Interference with the airway in any individual calls for measures that will immediately relieve the distress—one may procrastinate a little in adults, but in infants and young children delay can spell disaster under circumstances so tragic that once experienced, the observer shudders to even think of repetition. I take it that we agree that the disease condition under discussion is not new. Its general recognition as such is, however, probably comparatively recent. I have the feeling that we all have seen many of these cases in the past and diagnosed them as diphtheria, even though negative laboratory findings may have been recorded. Laryngeal diphtheria has been the cause of serious laryngeal obstruction in the past so often that instinctively we think of that disease when first seeing a child with laryngeal stridor. In the past, antidiptheritic treatment was instituted in all of these cases even without positive laboratory findings, and those that died still remained diagnosed as diphtheria. At the present time the effectiveness of toxoid and of diphtheria antitoxin should cause us to hesitate to make a diagnosis of diphtheria unless the case is proven.

Until a few years ago direct inspection of the larynx of an infant was practically unheard of and seldom done. With improved instruments there would seem to be no excuse for omission of this enlightening procedure. It can be done in the hospital room or in the home without danger and as simply as an ophthalmoscopic examination.

I have been impressed with the early appearance of the larynx in this condition in contrast to the ordinary acute catarrhal laryngitis in which there is a diffuse redness and congestion of the endolaryngeal tissues. These cases present a swelling of the tissues just beneath the vocal cord area without much evidence of diffuse inflammatory change. This, as you know, is the space inside the cricoid cartilage; the area is composed of loose soft tissues easily traumatized and quickly responding to infectious processes. It is in this location that the obstruction is usually found. Stridor produced by swelling here is usually inspiratory and expiratory and extremely exhausting. Bronchoscopic examination in the early stages shows nothing abnormal. As the disease process descends thickening of the tracheobronchial mucosa is noted with thick tenacious mucopus lying upon the surface. Soon this secretion dries and becomes tenacious and almost like glue; a type of dehydration seems to follow with the accumulation of added tenacious membrane and finally the entire tree becomes occluded at varying levels causing migratory atelectasis, the final stage being bronchopneumonia or massive collapse with anoxemia.

How should these cases be treated? The question has been raised as to whether any treatment is of avail. I believe that diphtheria antitoxin should be used early in every case regardless of objective findings; one, two or even more negative laboratory examinations do not rule against diphtheria. The use of antitoxin may do some good and certainly does no harm. The sick room should be warm and the air humidified. I question the efficacy of medicated steam and I doubt if one can evaporate enough water by an ordinary croup kettle to materially increase the humidity of an ordinary room. Certainly fluids should be pushed, intravenous glucose, blood transfusions and hyperdermoclysis, etc., have a definite place in the general care of these little patients. The inclination and temptation to procrastinate before operative intervention is, of course, well known. It is much better to open the trachea too soon than too late. The question of choice between intubation and tracheotomy probably will depend on the individual case, but most likely upon the convictions of the individual laryngologist. Personally, I have no hesitancy in choice and always select tracheotomy. The operation should be done early, long before what is ordinarily considered blue cyanosis. The pale cyanotic appearance about the mouth with increased pulse rate is certainly definite indication for immediate operation and early tracheotomy is good judgment, a late one shows evidence of vacillation and timidity, resulting in poor technic and an exhausted heart. The after care of these cases presents the most serious features of the disease. I do not know of any other condition requiring almost constant attendance by the physician. Certainly these cases require such service. Crises of obstruction develop so suddenly and dramatically that one may scarcely leave the room. The tenacious exudate in these patients can be removed only by one thoroughly familiar with past emergencies. We have tried adrenalin instillations to soften the crusts, and we have thought at times that they were helpful. A recent personal communication from Dr. Lyman Richards of Boston, who has had a great deal of experience with this disease, suggested perborate of soda instillations and that he had used this chemical in a case which recently recovered. We did not find it useful. Catheter suction seems the only dependable procedure. Bronchoscopy should be held in reserve, because I am sure the trauma of instrumentation in an already engorged tracheobronchial tree is not conducive to relief of edema and swelling. Supportive general measures with meticulous care of the local complications as they develop may save some of these patients. My limited experience makes me very pessimistic about the curability of most of these cases, particularly those of fulminating type.

Dr. E. A. Wester, Mt. Sterling: Dr. Whitaker's paper seems to clear up some doubts about a few cases I had last fall. Last October I was called at three in the afternoon to see a child, aged three years, about ten miles out, who had been seen earlier by a doctor in that town, who was not then available.

The child awakened about midnight apparently with the croup. They gave it some type of croup remedy and got only poor results. They called this other doctor at ten o'clock in the morning, he got there at eleven.

He went over the chest, said there was nothing much in the chest, and left some tablets, presumably iodized lime.

About ten o'clock the child began to get more dyspneic, and when I saw it at three it had a temperature of 100.4, rectal, pulse 130. The chest seemed to be just literally filled up with fluid.

The child was very cyanotic. While I was there the other doctor called up and said he was then available, so I told him to go ahead with the case, and I was through. He called me up the next morning and said the child's chest filled up more and it became more cyanotic and died about one o'clock that morning.

In February I was called out to see a child about two years old who gave about the same history of croup coming on in the afternoon. I saw it at nine o'clock at night. It was having epigastric and suprasternal retraction, very cyanotic, normal temperature but high pulse. The chest was full of bubbles and because of the experience with the iodized lime tablets given to the other child, I took a chance on giving it atropine. I fixed up some tablets in solution and had them give a teaspoonful representing 1/500 grain every three hours. The child stopped its breathing of that type the next day and seemed to be all right.

Two weeks later the same condition recurred I again gave it atropine and the child recovered in about a day and a half or two days. So far as I have been able to learn it had no other attacks. Both of these children had recently had diphtheria shots. The older child had had them about six months before and the other child about five months, and there was no history of exposure to diphtheria in either case. Diphtheria was my first thought, but on account of the shots I ruled that out. Both of the children were girls.

Dr. H. L. Ford, Champaign: I would like to compliment Dr. Whitaker on the very inclusive review. It certainly is very timely and it seems too bad more men could not have heard it.

My attention was first called to this in 1924, taking Dr. Jackson's course in Denver, when Dr. Baum reported four cases with three mortalities.

There are just a few points I should like to emphasize. There is the question of etiology. I recently have seen four cases. There have been five this winter in Champaign and Urbana all within three blocks. Two of these died. I had one of the two fatal cases, and two which recovered. I did a postmortem on the fatal case and the pathology showed an intense cellular infiltration with destruction of the tracheobronchial mucosa, a terminal bronchiolitis, secondary bronchopneumonia. At the time the post was done there was also a question of mediastinal emphysema, such as Baum suggested from a postmortem examination in a fatal case.

There had been a tracheotomy and three bronchoscopies performed with removal of many crusts.

Relative to the question of intubation or tracheotomy, the consensus seems to favor a tracheotomy in order that these secretions may be aspirated by bronchoscopies.

Of the eleven cases which Richards reports, four of those he questions as to the etiology, saying there was no tendency toward the downward extension and that steptococci were not present.

In talking of the etiology in the four cases which I saw with Dr. Graham, of the department of Animal Pathology of the University of Illinois, he brought out an interesting observation that in chickens we have a tracheobronchitis that is now considered to be due to a virus, and he feels that in all probability we are considering a secondary phase only: that we really have a virus causing the definite clinical entity, non-diphtheritic.

In the treatment the question of moistening the airway is to me very important. In the two cases that I last had and which recovered, one a youngster six years old, where the mortality is of course low; but the other youngster, where the mortality is supposed to be high (three years old), showing a greater tendency toward the downward extension and hoarseness, subglottic infiltration, both were kept in croup tents with sheet over the top, the steam going in constantly all the time, and no attention was paid to the humidity. The order was that they be kept under steam constantly. They were given thirty ounces of fluids by mouth daily and five per cent. dextrose in normal salt intravenously for the first few days. They were both given scarlet fever convalescent whole blood also.

In speaking with Dr. Hoyne yesterday, of the fatal case, I mentioned that I endeavored to use the Mosher life saving tube in the home, feeling the patient was dying when I first saw her, and he felt that in many instances where we endeavored to insert this Mosher tube as a life saving device, we angled the tube too much. I was unsuccessful in my attempt at the home to insert the tube. We rushed her to a hospital and did a tracheotomy and the subsequent bronchoscopies with removal of many heavy crusts from the tracheobronchial tree.

I should like to merely emphasze the fact that the condition is a definite clinical entity, non-diphtheritic, and the importance of diagnosis by direct laryngoscopic examination with measures directed toward keeping the airway clear and forcing fluids.

Dr. Walter M. Whitaker, Quincy (closing): This condition certainly remains something new to us, something which is stretching every bit of intuition and energy we have to attempt to solve the problem.

Dr. Wester's experiences are wholly in keeping with the experiences of all of you. I want to emphasize again that in the past the majority of these cases were called laryngeal diphtheria, and they certainly are not.

I am interested to know of Dr. Ford's association with Dr. Graham, and as he brought out, Dr. Graham has had some recoveries in cases in which he put in an intubation tube after he had previously done a tracheotomy, maintaining that the intubation tube provided for less tendency to a drying of the secretions. However, if that is the only reason for it, it seems to me we could accomplish the same result if we have intense humidity, of one form or other, in the room. As Dr. Ford mentioned, certainly the tracheotomy is of great value in the mechanical procedures which may be necessary later on in the case.

RECENT ADVANCES IN PLASTIC SURGERY WITH SPECIAL REFERENCE TO VASCULARIZATION OF IMPLANTS

HAROLD M. GOLDEN, D. D. S., Ph. D., M. D.
CHICAGO

Plastic procedures today have taken their place as a most valuable part of surgical craftsmanship. The object is no longer confined to cosmetic and esthetic ends, but rather to the rectification of disgusting, unsightly disease disfigurements and malformations which shut out the unfortunate victims from social and economic life. Plastic surgery has become a specialty to which many distinguished surgeons are devoting their whole time, constantly improving methods and technics. In Europe, it has its own specialist literature. The appearance of Jacques Joseph's[1] masterful book on facial and other plastic procedures has marked the final stage in the evolution of plastic surgery to its position as a specialty.

Naturally, defects in the face and other exposed parts call for most cosmetic plastic procedures. This is especially the case today, owing to the vast number of facial injuries due to automobile accidents, the yearly number of which is becoming alarmingly high. Every general surgeon should to some extent be acquainted with ordinary plastic methods and aware of the present practices and future possibilities.

In this paper I propose to review succinctly some recent plastic advances and to emphasize the measures taken to insure a good nutrient blood supply to implants which are so largely used. It must be evident to all that proper vascularization is one of the prime essentials of plastic surgical procedures.

Skin Grafts and Skin Flaps in Plastic Work. The use of skin grafts and flaps in reparative work about the face and upper trunk has undergone considerable modification in recent years. Distinction should be made between the words graft and flap, which are often used indiscriminately by many writers. A skin flap is made up of the whole thickness of the skin together with a nutrient pedicle; a skin graft is free skin removed from its original site and implanted elsewhere; it may be taken from the individual upon whom the implant is made, or from another, and may or may not include all the skin tissues. Padgett's[2] experiments have shown that blood matching has a good deal to do with the "taking" of a skin graft. Moreover, as he has shown, there are organismal differences between all individuals which determine the relations between host and donor in skin as well as in other grafting. The organismal differences in the same individual and in syngenetic transplants are obviously less than in heterotransplants. In Padgett's experimental 44 homotransplants of skin, 21 were free full-thickness grafts, and 23 were thin so-called Thiersch grafts. In only 4 cases, identical twins, did the grafts take and persist for 2 to 3 months. If the bloods are matched and the corpuscles of the donor are not agglutinated by the serum of the recipient, the graft lives for a longer time than when the opposite occurs. But even in an autograft the central part may, and usually does, become necrotic, while the peripheral part is becoming vascularized. As the closeness of relationship between donor and recipient decreases, less periphery lives and for a shorter time. In a homotransplant of skin (and this seems also to be true for other transplant material) the central part which becomes necrotic is much larger than in the case of an autograft, and complete destruction soon occurs. Autogenous skin grafts, therefore, appear to be the only practical ones to use in plastic surgery.

Davis and Traut,[3] who investigated the subject in 1925, found that the blood supply to whole-thickness grafts is established by anastomosis of small capillaries, by the upward growth of capillaries inside the old vessels and by the invasion of capillaries from the host texture, the latter being the slowest but the most permanent means of vascularization. The earliest they were able to demonstrate circulation in whole-thickness grafts was 22 hours; but an adequate circulation, to insure survival of a graft, is not established until about the eighth day. The studies of Paterno[4] about the same time showed that the establishment of circulation in skin grafts is partially dependent on the orientation of the blood vessels in the graft in relation to those of the surrounding structures.

It has been remarked above that the best part of the vascularization of the full-thickness graft comes from the host's underlying structures, hence there is, as Garlock[5] points out, much probability of such a graft becoming

necrotic if placed over bone or tendon or other poorly vascularized surface. A pedicled skin flap should be used in such cases.

The success of an ordinary pedicled skin flap depends upon the maintenance of sufficient circulation through the base of the pedicle until collateral circulation is established. These flaps are admirably suited, as pointed out by Spaeth[6] for ophthalmic defects, especially for one in which the tissues contiguous to the defect themselves contain contracting scars.

The tubed skin flap is a modification of the pedicled flap, which was developed by Gillies, of London, during the World War. It is a double-pedicled flap with the edges sutured together so as to leave no raw surface exposed.

Curt von Wedel[7] remarks that whenever possible a pedicled skin flap should contain a major artery with an unimpaired venous return. Unless the flap contains such an artery it should not be more than two and one-half times as long as the pedicle is wide.

German, Finesilver and Davis[8] have studied the establishment of circulation in tubed skin flaps. Their experiments indicated the establishment of an adequate blood supply from a single pedicle (of a double-pedicled skin flap) within 7 days. They noted that the number of blood vessels in the skin varies in different regions of the body, being greatest where the skin is most subject to external pressure. These authors think they are justified in stating that in a tubed flap the normal vessels of the human skin increase in size and number and that the main vascular channels are reorientated to correspond with the long axis of the flap. They found that the base pedicle of a tubed flap may be severed by the tenth or eleventh day, the pedicle being divided piecemeal, about one-third at a time. The longer the tubed flap is allowed to remain intact, within certain limits, the more stable the blood supply becomes; but the establishment of circulation occurs considerably earlier than was previously thought possible, and consequently it is safe to divide the pedicle sooner.

In using a tubed flap New and Havens[9] prefer to wait three months before transferring it to its new position. This, they think, insures its blood supply and is a safeguard against infection as well. When a pedicled flap is taken from the forehead for use on the face, the angular artery may be used as the main supply, or if the pedicle is in the temporal region, the superficial temporal artery may be employed.

Woolsey[10] points out that split skin grafts, those being less than full thickness, are now being used more frequently than ever before, but remarks that only about 65% of such grafts "take" sufficiently. A free epidermic graft lives a parasitic life for the first 48 hours dependent upon absorption of plasma or lymph from the host. Capillary connections form with the host's local blood supply and by the fifth day a graft, if successful, will have a very firm attachment and a pinkish-white or pink color.

Havens[11] calls attention to the necessity at times of applying a skin graft to the undersurface of a pedicled flap in order to provide a lining for a cavity to be filled in by the flap. Such skin graft is usually taken from the arm and is a full-thickness graft. It usually "takes" and is applied as soon as the skin flap is elevated.

Russell[12] describes a new method of skin grafting. A cylinder, made of ordinary carpenter's sandpaper, is quickly scuffed across the forearm which is held adjacent to the defective spot desired to be covered with skin. The abrasive action of the sandpaper causes the fine fragments of skin cells (the outer surface skin which will grow rapidly as grafts) to be implanted on the defect. At the malpighian layer a burning sensation is produced as the cylinder is advanced.

Somewhat analogous to this is the implanting of active epithelium as described by Kohn[13]; he uses the edge epithelium of the wound or defect itself, which, histologically and biologically, is young active epithelium; it is undermined and spread over the defective surface. Neuhäuser[14] states that he has employed this method since 1918.

Col. W. L. Keller, M. C., U. S. A.[15], calls attention to the excellent results obtained from the "tunnel" skin autografts in the Walter Reed General Hospital. This is an adaptation of the Esser whole-thickness inlay. It is effected by tunnelling through a band of tissue, such as an eversion of the lip or a contracting fold, then drawing into this tunnel a whole-thickness graft and, after 5 or 6 days, cutting through from the external skin surface to the tunnel grafted skin. Keller says that this graft is successful because it is completely surrounded by living tissue, and, as any graft must subsist on lymph for

several days, the plasma circulation is more efficient and completely bathes the transplant within its tunnel, furnishing an ideal environment, as no better medium could possibly be obtained for the preservation of the grafted tissue. It seems probable also that the capillary circulation is more quickly established and the period of defective nutrition shortened.

PLASTICS OF THE FACE

A number of new methods or improvements over old methods of plastic repair of defects or blemishes in the facial region are to be noted in recent literature.

Materials. Carter[16] has experimentally investigated the ultimate fate of bone when introduced for the purpose of correcting a facial deformity. He has been able to follow the course of a number of human cases and has noted that, if aseptic conditions are preserved and the transplant is contacted with living bone, it will establish osseous connection with this bone and continue to live and to grow, its growth being regulated by the functional demands of the part. Such transplanted bone is not absorbed; if infection should occur, part of the transplant becomes necrotic but sufficient is left, so that the necrotic area is ultimately filled with new bone by the action of the osteogenic cells remaining in the live part of the transplant. Autogenous transplants give permanent results.

The central part of a bone transplant may die, as has already been stated in regard to skin grafts, and in roentgenograms this looks like a medullary line.

Carter[16], states that the ultimate fate of a bone transplant is dependent on the reëstablishment of its capillary circulation through the Haversian canals and canaliculi to the lacunae where the osteoblasts lie. This process is not complete until the bone has been penetrated by new blood vessels. If the transplant is fairly thick and of dense bone, there is some difficulty in nourishing its center, which, of course, is furthest removed from the peripheral blood supply. This has been clearly indicated, in all of Carter's transplants that have been in position for six months or longer, by a line of absorption in the middle of the transplant, giving the impression that it is a small medullary canal, which in fact it is.

In the case of cartilage, which contains no blood vessels, nourishment is distributed by means of intercellular circulation. It is this difference in the method of receiving its nourishment that accounts for the fact that cartilage may be introduced as a transplant into the soft tissues and that its permanency will not be affected by the circumstance that it is not in contact with living, periosteum-covered bone. In fact, even if it is in contact with bone, it never establishes bony union.

Regarding other materials used for reparative work, most plastic surgeons regard ivory and paraffin as foreign bodies, yet such an authority as Joseph continues to use elephant tusk ivory implants in nose work, Mootnick[17] seems to favor it, and Pollock[18], of Chicago, prefers ivory to either bone or cartilage, the advantages being, despite its being a foreign body that there is no double operation, no risk of infection or fracture. Pollock suggests that cartilage transplants, in order to secure fixation, be perforated in the hope that connective tissue will grow through the holes.

I, personally, have found that the use of ivory for implants leaves much to be desired. Its only advantage is the saving of the operation for the removal of cartilage. In correcting saddle noses, when it was impossible for the patient to take the necessary time for the cartilage transplantation, I have substituted a long, narrow, properly shaped piece of celluloid, with excellent results. This material is resilient and is not absorbed; it neither gives rise to tissue reactions of any consequence nor does it make the patient feel conscious of a foreign body in the nose. It is my practice to make multiple perforations in the foreign-substance inlays for added fixation, as recommended above, but I have not found this procedure necessary when using autogenous cartilage.

Eckstein[19], who is 1901 introduced the use of hard paraffin (with melting point above 50° C.) states that it still gives excellent results. He uses it for interventions on the face and to a limited degree for breast plastics, and states that it is not absorbed.

In this I do not agree with him. The use of either the hard or soft paraffin no longer has any place in plastic surgery. The paraffin is to a certain degree absorbed, and what remains becomes encapsulated in a network of fibrous connective tissue which in a short time becomes

a hard mass (paraffinoma). The nutrient blood supply within the mass becomes very meager and the pressure exerted from below, upon the overlying skin causes it to lose its natural color. The desired contour is lost within a short time, leaving an unsightly nodular appearance. I have had occasion to remove many such masses and cannot emphasize too strongly, the undesirability of this material.

Methods. Rush and Rush[20], Blair[21], and others mention the desirability of making exact plaster models of a facial defect before attempting its repair.

In the cosmetic restoration of the aged face, Maliniak[22] states that when a large amount of redundant skin can be safely excised, a good immediate result is obtained, followed in a few months by a marked circulatory improvement of the skin. The stretching and wide undermining of the skin produces a secondary circulatory effect which often is quite remarkable; the senile complexion of the skin gradually improves because of vascular neoformation.

In remedying defects in the face it is well to consider Langer's lines of cleavage which roughly correspond to the wrinkles of old individuals; an incision made across a wrinkle or potential wrinkle is likely to gap widely and make an ugly scar.

Sheehan[23] mentions that in drawing together the wound edges after excision of a keloid scar they are approximated with little tension over a capillary tube of radium emanation, which appears to favor freedom of circulation and prevents ridging.

We now come to plastics of particular regions of the face or special conditions. For the repair of small saddle defects of the nose, Straatsma[24] uses a dermal graft, namely, de-epithelialized derma, which is prepared by shaving off the top layers of the skin, discarding them and using the basal layers as a subcutaneous graft. Von Eitner[25] was the first to use this type of free graft in 1924; no shrinkage allowance is said to be necessary. Blair[26], for partial losses and reconstructions, prefers a pedicled flap from the forehead, its superiority over other materials making up for the added facial scar. Mootnick[27] thinks costal cartilage best as, unlike bone, it does not shrink, heals well and gives a good cosmetic result.

Maliniak[28] describes a new method of plastic repair of limited nasal depression, which consists of the endonasal transposition of the lateral nasal cartilages together with the subcutaneous tissue and their implantation into the dorsal depression. By this method the use of free cartilage grafts is rendered unnecessary and the deformed lateral cartilages are corrected at the same time, being remodeled and mobilized by the endonasal route.

Wodak[29] mentions a curious happening in nasal plastics. The inflammation set up by the presence of a foreign body, such as an ivory implant, may produce the formation of new tissue which helps the filling up of losses of substance.

I have observed this phenomenon in a number of cases from which I had occasion to remove ivory and celluloid implants. This reaction appears to be so constant that I should not hesitate to recommend the implantation of a foreign body for a brief period, for the express purpose of setting up this inflammatory reaction for the correction of saddle noses of a moderate degree.

Lieberman[30] reports an original method of correcting deformities of the skeletal part of the nose. After dissociation of the skin he makes an upward concave incision on the root of the nose, introduces an anchor-shaped piece of gold wire and pulls up the disproportioned or displaced skeletal part.

The lips and eyelids are receiving more attention in plastic work than heretofore.

Blair[31] describes how vermilion bordered flaps may be switched from one lip to the other to improve defects. The superior coronary artery gives a good blood supply to the flaps. Straatsma[32] mentions a case in which a defect of the lower lip was repaired by a tube-pedicled flap taken from the anterior fold of the neck and attached to the lip; this end portion being nourished from the end attached to the neck.

Gillies and Kilner[33] have devised a number of plastic operations for the correction of the secondary deformities due to harelip. The commonest contour deformity seen in old harelip and cleft palate cases is produced by flatness of the lip and depression of the nose. The plastic procedure that will be found most widely applicable to this type of deformity is the buccal inlay. It consists of the introduction of a Thiersch graft on a mold designed to free the

lip and nose from the underlying retroposed maxillae. Freeing and loosening the lip in this way allows the wearing of an upper denture.

Gillies has also devised what he calls the "Cupid's Bow" operation for cases of prolabium in double harelip; the prolabium is often placed so far down the lip that the lobule of the nose is dragged down with it. The plastic operation consists in discarding altogether the existing skin vermilion junction and making a new curved lip border at a higher level. The result is an attractive short lip with full mucous membrane.

With regard to the eyelids, Dantrelle[34] tells how he was the first, in 1916-1917, to employ a fusiform full thickness flap from the upper eyelid to cover a defect on the lower lid. Thus he revealed a source of replacement not only for the lids but for small defects anywhere on the face, provided there are no peculiarities of pigmentation. A very recent article by Blair[35] is a good example of the extent to which plastic surgery has been pushed in repairs and adjustments of injuries and defects of the eyelids. Not only the anatomy and contour of the lid but also of the structures that give it support are restored.

Special disease conditions of the face have had the attention of the plastic surgeon. Moure[36] describes how lupic tissue diminished about a very vascular flap supplied with a wide nourishing pedicle. The flap did not become contaminated but the abundant blood supply within it had a favorable influence upon the neighboring tissue, which favorable effect ceased when the pedicle was severed too soon. Such a flap must be left attached to its pedicle a long time. Much patience has enabled Moure to obtain cures in some cases of mutilating lupus of the face seemingly beyond the reach of any method of treatment. The continuous supply of blood to sclerotic regions otherwise with very poor blood supply is an excellent aid to treatment.

Tixier and Bonnet[37] report a case of extensive epithelioma of the eyelids, in which the tumor was removed and the defect in lids and face covered with a pedicled skin flap from the forehead. The pedicle was cut 13 days after fixation and the final result was highly successful. New and Havens have also used pedicled grafts in repairing the defects left after healing following surgical removal of epithelioma of the face.

Plastics in Facial Paralysis. The work of Ballance and Duel[38] in the operative treatment of facial paralysis by nerve grafting and other procedures has commanded universal attention. Their method of procedure is to effect restoration of the continuity of the paralyzed facial nerve. They have proceeded on the assumption that anastomosis with another nerve alone will not suffice. In their method strips of fascia from the thigh are transplanted through an incision continuous from the temporal to the preauricular area, carried under the skin to a point on the chin where the strips are looped around a stanchion of paralyzed muscle and then returned by the same route to the point of entry and anchored. This maintains the facial muscles on that side of the face against the pull from the sound side. Movement and function of the muscles is effected by utilizing the innervation of the masseter and temporal muscles in the fallopian canal. Paralyzed muscles have the power of taking up the nerve current from living nerves with which they are brought into contact by nerve grafting. A piece of the external respiratory nerve of Bell in the axilla is used to fill the gap in the facial nerve. The authors insist that the operation be done immediately after injury and the severed nerve connected up.

Plastics of the Hypertrophied Female Breast. At various times surgeons have attempted plastic operations for the reduction of pendulous or hypertrophied breasts. Operation is only rarely for strictly cosmetic or esthetic purposes but rather to remedy intolerable disability or a source of social and economic disadvantage. The older methods consisted either in amputation of the breasts or of large discoid excisions of the skin and underlying tissues on the anterior part of the breast, with fixation of what was left to the upper ribs—a mastopexy. But within the last decade or so many procedures have been worked out having for their object limitation of excision to the lower pole and posterior part of the breast and not involving the region of the galactophorous ducts so as not to interfere with breast feeding. For esthetic purposes operations have been devised for reforming of the hypertrophied breast following transplantation of the nipple with its areola to its proper site.

This transplantation may or may not, according to different methods, be effected in such a way as to preserve the function of the lacteal ducts. Some of the methods are characterized by attempts to prevent necrosis of the transplanted areolar area by not interfering with the blood supply provided by the internal mammary and thoracic lateral arteries.

Operations to completely disconnect the nipple and areola from the subjacent tissues and transplant and suture them in their normal site at the natural level have been done for more than a decade. Max Thorek[39] of Chicago was the pioneer in this type of operation and has done a large number in this manner, reporting excellent results. In Germany, Lotsch, Holländer, Biesenberger, Gläsmer, Joseph and several others devised different methods of doing this operation. In France, Dartigues has been its chief exponent, and in the United States Maliniak and others.

In Lotsch's[40] method, introduced in 1923, the nipple and areola with the subcutaneous tissue are circumscribed by a circular incision; an elliptic incision is made across the skin of the upper pole of the breast just above the areola, the skin freed from underlying structures and the nipple with its appendages slid beneath the detached skin into a button-hole bed already prepared at the proper level above. The under pole of the breast is then resected and the breast reformed from the remnants. Holländer's[41] method is much the same, resection of a segment of the breast and circular incision of the nipple which is pulled up and fixed in place by cutaneous sutures. It gives a good result except that the breast is crossed by a scar; however, it is not so suitable for large hypertrophies. Dartigue's[42] method of large resection of the lower part of the breast after transposition of the nipple and areola is especially applicable to large hypertrophies. However, it suppresses all possibility of lactation and runs the risk of necrosis by interference with the blood supply.

Joseph's[43] transposition of the nipple and areola is also a lifting up method, but his particular purpose is to insure the vitality of the transposed areolar part of the breast by leaving it attached to a wide skin pedicle which is severed later as mentioned by Maliniak[44].

Biesenberger[45] similarly transposes the nipple and areola, but preserves the lacteal ducts. In reducing the hypertrophy he spares the important mammary blood vessels by making a vertical incision downward from the nipple to the submammary fold and a lateral incision, beginning near the axilla and sweeping downward to the under pole of the breast, then excavating the superfluous fatty and parenchymal tissues, the greater part of the upper and lower outward quadrants being removed, with cosmetic reconstruction of the breast.

There are many variations of these methods such as that reported by Fraenkel[46] in which the Lotsch and Biesenberger methods are combined with a good immediate cosmetic result.

Most of these procedures are two or even three-stage operations. In capable hands with a mastery of the technic good cosmetic results can almost be assured; but, apart from the dangers of infection and necrosis, there is a tedious and costly delay for the patient. There would appear to be no serious reason why a one-stage operation might not be equally successful, less risky and far more acceptable to patients. The really important part of the procedure is the preservation of the blood supply and as little interference with main vessels as possible.

Cosmetic breast correction does not apparently disturb the physiologic course of events during and following pregnancy. Biesenberger's[45] method of preservation of the lacteal ducts ensures lactation. He cites one case of normal pregnancy and spontaneous birth with ample lactation capacity three and one-half years after a Lotsch operation for bilateral pendulous breasts.

Different from the foregoing is the procedure of plastic reconstruction of a breast in the case reported by Reinhard[47]. Here the right breast had been completely amputated for cancer. Reinhard reconstructed a right breast by incising the left breast in two halves, leaving the nipple in place. The right half was transplanted by sliding it to the site of the right breast, leaving a pedicle of skin and fat connecting it to the remaining left half of the left breast. In a later operation the pedicle was severed. Two further operations were required for the reforming of the two breasts. Reinhard constructed a nipple for the new right breast but he does not say how.

There are several other phases of plastic surgery that I have not mentioned here, the discus-

sion of which would make this paper unduly long. Some of these I shall deal with in future papers.

4737 Broadway.

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AMEBIASIS IN GENERAL MEDICINE

A Preliminary Report

FINDLEY D. JOHN, M. D., and
THOMAS L. DAGG, M. D.
CHICAGO

Ever since the dawn of modern medicine infection of the intestinal tract has claimed its untold thousands.

Physiology, pathology and bacteriology of the tract, all have been studied, and a great deal of practical knowledge has been obtained by these departments of medical science and research.

But our purpose in this paper is to point out the fact, and direct attention to the paramount importance, of *Parisitology* of the intestinal tract; and to the frequency of parasitic infection, particularly to the various forms of ameba in this and in other parts of the human system.

Amebic dysentery, of course, is well known and well recognized in this country. And its wide geographic distribution is becoming more and more a matter of concern to public welfare and public health. But in our opinion from cases studied, amebiasis is potentially the direct or indirect cause of a far greater amount of disease and ill health in human carriers in this country than all other intestinal infections combined,—none of which is evidenced by the dysentery form.

After many months of careful routine examination of stools with improved technic and skilled technicians, we find that the ameba is a common inhabitant of the human bowel. In over a hundred selected cases so checked, all without history of dysentery, we found the animal parasites or cysts in all of them. In most of them the ameba histolitica was present. In many instances more than one form of ameba was present, as well as trichomonads, cercomonads, etc.

The group of cases we examined in this rou-

tine work included many ailments: as gastro-intestinal, chronic constipation, mucous colitis, spastic colon and gall bladder; skin lesions, as psoriasis, acne and eczema; also epilepsy, asthma, migraine, Graves, mental depression, nephritis, cardiovascular arthritis, diabetes; they may also be isolated from aspirated infected gall bladder, from the stomach content of pernicious anemia, in sputum from lung abscess, and from the gum line in pyorrhea. These latter are motile, contain red blood cells in their protoplasm, and in all respects resemble those found elsewhere in the body. And we believe this to be a common source of spreading the infection from direct contact. Barrow[1] reports finding them in arthritic cases; Dobell[2] reports fifty autopsies of amebic brain abscess.

In early June, 1932, a case came under our (J) care, a young woman of nineteen, who had been treated for ten years for a so-called colitis. Many stools had been examined bacteriologically, and a laboratory first gave us a negative report on ameba. But after insisting that a more thorough and careful examination be made, the case was found to be highly positive for ameba.

This patient had been under constant medical care, was hospitalized repeatedly, had spent a great deal of time in Arizona and elsewhere for her health. When I first saw her she was a small anemic girl weighing 92 pounds. She responded promptly to amebic treatment. I then investigated the girl's family, father, mother, sister, and two small brothers, all of whom were highly positive for ameba. The father had a duodenitis, the mother complained of a generalized arthritis and constipation. The sister and two brothers had no apparent constitutional symptoms.

Writers on parisitology tell us that ameba histolitica is the only pathogenic form; which may be true so far as amebic dysentery is concerned. But they ignore, or are not aware of, the many other forms of illness in which these organisms are present, which, when removed from the tract the patients get well of their complaint. Hence the importance of investigating the intestinal tract for these parasites can not be over emphasized. For it is only by investigation that we get at the cause. And to discover the cause of disease is the very foundation of scientific medicine.

Bacteriologists have shown conclusively that great changes in virulence, morphology and pathogenicity occur in bacteria due to environment and culture. Rosenow[3] describes strains of streptococci which show all gradations of morphology, from perfectly round cocci to straight and clubbed bacilli. Rosenow and Jensen[4] also describe the selective localization powers of various strains of strep for certain portions of the body, e. g., one strain has selective localization for joints; another for the heart; another for the nervous system, etc. And that this power of selective localization is also modified by cultural environment of the specific strains.

Now, if culture and environment modify the form as well as the virulence of bacteria which produce disease, we should at least expect to find some variations in the virulence of amebic infections. And this is precisely what we do find. We find them in liver abscess; McDonald[5] of London reports cases of lung abscess and lower lobe congestions due to the ameba; he also reports their invasion of the spleen and the genito-urinary tract as well as the brain.

We believe that amebiasis is a common infection in this country; that it is endemic in the temperate zone as well as in the tropics; and that it manifests itself in a variety of complaints, more or less chronic in character, and entirely apart from the acute and epidemic form of amebic dysentery.

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THE SCHILLING DIFFERENTIAL BLOOD COUNT

Its Significance as an Aid to Diagnosis in Typhoid, Malaria and Undulant Fever

FANNY BELL WARNOCK, A.B., M.T.

CHAMPAIGN, ILLINOIS

The blood picture in typhoid fever is generally accepted as a leucopenia with lymphocytosis. While studying routine Schilling differential blood counts in this hospital, repeated observations on cases with persistent high or unexplained fevers have suggested a differential count fairly constant in typhoid fever. The peculiar left shift noted in the polymorphonuclear neutrophilic

From the Laboratories of the Burnham City Hospital, Dr. B. G. R. Williams, pathologist.

leucocytes has been present irrespective of leucopenia or lymphocytosis. In cases of mild but continued fevers where polymorphonuclear neutrophiles were within normal limits, only the Schilling differential was suggestive of the blood findings in typhoid fever. Several such observations were followed by positive bacteriologic findings.

In 18 cases, including 35 blood counts, where typhoid was considered, bacilli of the typhoid group were isolated from ten. Where culture material was not submitted, agglutinations were positive in dilutions of 1:160 to 1:1280. Only 5 cases showed a white cell count below 6,000. Only 8 showed lymphocytosis above 35 per cent. But in 15 cases there was an extreme left shift of polymorphonuclear neutrophiles amounting to a ratio of 1:1 or more of total non-segmented to segmented cells. Of the three remaining, the counts were not secured from two cases until late convalescence. The third atypical count was from an ambulatory patient in for observation. He had no fever, gave no history of typhoid, but on two occasions B. paratyphosus Beta was isolated from his blood stream. The second culture was confirmed by a duplicate specimen sent to the Bacteriology department of The University of Illinois. In short, this blood picture of normal or reduced white cell count together with young polymorphonuclear neutrophiles tending to outnumber the mature segmented cells was regularly present during the febrile state in all proved cases of typhoid. It occurred irrespective of lymphocytosis.

Where typhoid fever was questioned but never proved by repeated cultures and Widals, one of three blood changes was observed: 1. Where other diagnosis was definitely reached it was noted that either the total white cell count was 10,000 or well above that or else the shift index never exceeded 1:1, rarely ever reaching that proportion. 2. In a few cases of acute enteritis although cultures were negative, nevertheless the blood picture repeatedly approximated that observed in typhoid. 3. Where the diagnosis was eventually settled as undulant fever or malaria, this shift ratio was equal to or often greater than that seen in typhoid fever.

Of 10 cases where malarial parasites were found in blood smears, 4 showed total white count under 6,000. All the counts were under 10,000. Six showed lymphocytes above 40 per cent. Each of the ten showed a shift ratio of 1:1 young neutrophiles to mature, while 6 of them showed 2:1 or more. (This ratio is normally placed at 1:16.)

Of 10 cases of long continued fever where Brucella agglutinations paralleled significant clinical manifestations, only one total white count was below 6,000. Only one (case 1) Table 3 was above 10,000, and it was taken 10 days after the acute throat and joint symptoms has subsided. During this time the total count had been normal. This count of 12,000 was accompanied by 9 per cent. eosinophiles. Blood counts from each of these 10 cases showed at some time, lymphocytes well above 40 per cent. In 9 out of the 10, the shift index varied from 1:1 to 5:1. Case 10, Table 3, with a shift index of 1:2, showed 56 lymphocytes and 4 eosinophiles, agglutination to at least 1:1280 and had been ill for several months, with no definite diagnosis.

This blood picture of normal or low white cell count with extreme left shift of polymorphonuclear neutrophiles has been observed in influenza, diphtheria, tuberculosis, chickenpox, bacillary cystitis, and sometimes in arthritis, mastoiditis, appendicitis or cholecystitis. However, the shift to left has rarely resulted in so high a shift index as in these three diseases cited above. In typhoid fever where blood counts were made at frequent intervals throughout a period of weeks, this blood picture has remained constant. So far, we have not found this to hold true for diseases other than typhoid, undulant and malarial fever. Gradwohl,[1] however, reports serial counts of three cases of tuleremia, giving a similar Schilling differential even before agglutinations are positive.

Summary. It has been noted in 15 cases of typhoid fever, 11 cases of undulant fever and 10 cases of malaria, that beside the low white cell count and frequent lymphocytosis, during the height of the fever there occurred regularly a concurrent marked left shift of polymorphonuclear neutrophilic leucocytes where the young band forms tended to outnumber the mature segmented cells. In the majority of cases where these diseases had been questioned but not proved, this blood picture has been absent. In those cases where this blood picture has been present with suggestive clinical symptoms it has been followed by confirmative laboratory findings.

Conclusions. In typhoid fever a shift ratio of 1:1 or higher, non-segmented to segmented polymorphonuclear neutrophilic leucocytes, accompanied by a leucocyte count not over 10,000 has been a constant finding throughout the course of the fever.

This blood picture has also been observed in counts taken at random in malaria and undulant fever.

The high shift ratio has been a more constant finding than leucopenia or lymphocytosis in the 39 cases studied.

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For helpful suggestions and for criticism of the usefulness of this work to a physician, I am indebted to my friend, Dr. J. S. Mason of Urbana, Illinois.

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TABLE 1. REPEATED COUNTS IN TYPHOID

			Schilling Differential								
No.	Date	W.B.C.	P.N.	M	J	St	Seg	Ly	LM	E	B
6	7/6	4,200	79	..	2	67	10	20	1	..	..
	7/7	3,800	62	..	3	56	3	34	4	..	..
	7/8	3,600	74	..	6	52	16	24	2	..	..
	7/10	2,500	69	..	2	58	9	31	..	..	..
	7/19	2,900	57	..	2	35	20	40	3	..	..
	7/29	3,100	..	..	..	..	..	..	..	..	..
	8/6	13,400	62	..	1	29	32	36	2	..	..*
	8/19	15,500	70	..	..	29	41	24	4	2	..*
7	8/5	5,600	68	1	8	52	7	22	9	1	..
	8/7	6,000	73	1	6	47	19	24	3	..	..
	8/8	8,400	66	..	..	49	17	27	7	..	..
	8/11	8,700	64	..	2	42	20	26	10	..	..
	8/14	7,300	70	..	..	50	30	22	6	1	1
	8/25	3,500	57	..	3	28	20	36	6	1	..
14	10/12	8,400	68	..	3	45	20	27	4	1	..
	10/14	7,200	72	..	3	34	35	21	6	1	..
	10/16	7,100	73	..	1	38	34	22	5	..	..
	10/23	6,000	50	..	2	38	10	44	2	2	2
	10/30	5,300	52	..	2	34	16	35	12	1	..

*Pneumonia.

TABLE 2. SCHILLING BLOOD COUNTS IN MALARIA

		Schilling Differential								
	Schilling Differential									
No.	W.B.C.	P.N.	M	J	St	Seg	Ly	LM	E	B
1	4,700	55	..	..	29	26	43	2	..	..
2	9,700	63	..	4	39	20	28	8	1	..
3	4,800	65	1	2	44	18	28	5	2	..
4	6,400	40	1	3	29	7	52	7	1	..
5	7,800	67	1	2	37	27	31	1	1	..
6	low*	73	..	3	48	22	26	..	1	..
7	low	45	..	..	32	13	48	7	..	..
8	low	56	2	1	30	23	41	3	..	..
9	4,300	34	..	..	24	10	57	4	1	4
10	4,100	35	..	1	22	12	58	7	..	..

TABLE 3. SCHILLING BLOOD COUNTS IN UNDULANT FEVER

			Schilling Differential								
No.	Date	W.B.C.	P.N.	M	J	St	Seg	Ly	LM	E	B
1	2/13	7,700	31	..	..	26	5	66	3	..	..
	2/24	12,000	64	..	4	40	20	24	3	9	..
2	3/9	6,000	76	..	4	49	23	31	3	..	..
	3/23	7,000*	56	..	..	22	34	42	2	..	..
3	9/9	5,500	51	..	2	25	24	44	5	..	..
4	11/12	8,500	61	..	2	25	34	37	2	..	..
	11/29	6,400	51	..	1	37	13	48	1	..	..
5	11/29	6,100	39	..	..	14	25	56	1	4	..
6	12/30	6,100	39	..	3	22	14	54	7	..	..
7	6/24	6,400	37	..	..	22	15	51	12	..	..
8	7/1	6,400	40	1	3	29	7	52	7	1	
9	7/16	6-7,000* (est.)	41	..	1	24	16	50	9	..	..
10	1/28	6,100	37	..	..	20	17	49	12	..	2

*Total count estimated from smear.

DIVERTICULUM OF THE BLADDER WITH REPORT OF AN UNUSUAL CASE

Review of the Literature

HARRY C. ROLNICK, M. D.
PATRICK H. MCNULTY, M. D.
CHICAGO

A diverticulum of the bladder is a pathological condition resulting from separation of the muscle bundles through which the mucosa herniates carrying a larger or smaller number of muscle fibers, which together with the serosa form a sac whose cavity communicates with the bladder by a large or small orifice. The smaller orifices are surrounded by the bladder musculature in a sphincter like manner and are called true diverticula. Those with larger orifices have no sphincter like aperture. Their contents empty readily with that of the bladder. They do not require surgical treatment and are called false diverticula.

Practically all early authors recognized two types of diverticula, namely, congenital which exist at birth as the result of embryological anomalies, and acquired which develop after birth as the result of obstruction at or below the vesical orifice with consequent abnormal increase of intravesical pressure. Clinical differentiation of the two types is confusing and studies made during recent years lead one to believe the terms are poorly chosen. The above classification depends upon the supposed difference in etiology for which exact proof is wanting. The number of men whose names are recorded in the literature on this subject are legion and are listed in chronological order from the time of Hippocrates to the present by Polkey. Lowsely and Gutierrez divide the history into ancient and modern eras, each with a sub-period. The first period of the ancient era dates from the beginning of medicine with the names of Hippocrates, Aristotle,

Galen, Celsus, Von Helmont, and Paracelsus in the prehistoric period of science; and Pierre, before and after the beginning of the Christian era when perineal lithotomy was performed and all physicians were practical urologists. Then we come to the time of Morgagni, Haustet, and Cruveilhier, in which all findings were based on autopsies and anatomical studies. True diverticula were considered anomalies and not by any means a definite pathological entity. The second period begins with Virchow, Frank, Englisch, Hauser, and Chopart and is characterized by histological and clinical studies. During this period the most striking theories of the formation of diverticula were advanced, but to Haustet and Cruveilhier are due credit for the theory of "hernie tuniquaire" or hernia of the mucosa be-

Fig. 1. Cystogram: Urethral catheter in place in bladder and ureteral catheter coiled in diverticulum. Diverticulum larger than bladder.

tween muscular trabeculae. Englisch, of this period, is credited with originating the classification into congenital, based on the presence of muscle bundles in the sac walls, and acquired, based on the absence of muscle bundles in the walls. Hinman in 1919 after histological study of a large number of specimens refuted this concept).

The modern era begins with the names of Nitze and Albarran and the discovery of the cystoscope. The second period of this era is characterized by the development of roentgenology, urography, and the use of the cystogram by Wulf, Schamberg, Perthes, Saglitzer, Voelcker, Von Lichtenberg, Papin, Young, Braasch, Keyes and Hinman up to the present date when these procedures have been universally adopted.

Most writers among whom are Englisch, Von Eberts, Fischer, Brongersma, and Judd accept the dual classification, Some, Lower, Lerche, Wagner, Serralach, believe all are acquired. Cabot, Israel, and Hofmakl, believe the great majority are congenital.

The following evidence is advanced in support of the congenital theory:

1. Occurrence in females without evidence of obstruction and with thick walled sacs refute the concept of herniation of the mucosa through the musculature.

2. The diverticula found with prostatic hypertrophy were usually relatively small, frequently multiple, and have thin walls.

3. The literature in the past held forth the fact that diverticula had never been produced experimentally in animals. In 1928 Herbst, Polkey, and Weller were successful in producing true diverticula in animals by causing obstruction of the vesical orifice surgically, and increasing the intracystic pressure by introducing infection.

The evidence supporting the theory of acquired diverticula may be summarized as follows:

1. Diverticula have been produced experimentally in animals.

2. Diverticula are seldom found in females and young male children. Hinman reports after a study of 205 cases from the literature and 21 personal cases, less than 0.4% in females. There were only 7 undisputed cases in females and these gave a long history of frequency of urination and had marked trabeculation and cellule formations as evidence of obstruction.

3. L. P. Wershrub, in 1932, reported a case of the large diverticulum in a female with urethral caruncle and states that 90% of the cases studied had caruncles which he thought caused the obstruction.

4. Kutzman, in 1933, reported an analysis of 100 cases in which obstruction of some form was present in all cases.

5. Diverticula are most frequent in males over

50, that is, at or beyond the age when vesical orifice obstruction commonly occurs.

6. Associated evidence of obstruction as trabeculation or hydroureter are almost universally present. Absolute exclusion of obstruction in some form, at some time, in supposedly congenital diverticula is not possible. Diverticula are more common with sclerosis of the vesical orifice than with prostatic hypertrophy. This is explained by the fact that sclerosis begins earlier in life and the obstructive pathology is usually present over a longer period of time.

The consensus of opinion of most writers may be summarized as follows:

It cannot be proven beyond a doubt that congenital diverticula may occur but they are not common. Most diverticula develop as a result of obstruction to micturition coupled with the presence of weak areas in the bladder wall. The floor of the bladder and margins of the trigone are fixed areas to which the more or less freely movable parts of the bladder wall are attached. Intravesical pressure will exert its greatest strain on areas near the fixed portion. Hypertrophy of the muscle bundles occurs with the associated increase of the polyhedral spaces between, until the mucosa herniates through the musculature. Once the herniated portion is freed of most of the musculature, it can increase in size indefinitely.

The diagnosis of the condition is made only by special examination as the symptomatology is that of the associated obstruction of the vesical orifice. Simple cystoscopic examination reveals the diagnosis in a large percentage of cases. W. B. Tatum in 1927 described a new instrument which carries a light on the end and can be inserted through a cystoscope into the diverticulum for accurate examination of the cavity. Severe diffuse cystitis may at times cause the orifice to be overlooked due to edema of the vesical mucosa. A diverticular orifice in the blind spot of the bladder may be overlooked with the ordinary instrument. The rare cases of carcinoma of the bowel with a fistulous opening into the bladder may be wrongly diagnosed.

Intravenous urography is valuable especially if the ureter opens into the diverticulum. Cystograms made after injection of air or any of the opaque solutions recommended give accurate information as to the size and location and frequently aid one in choosing the operative procedure best suited.

Treatment. The discussion of the treatment may well be opened by quoting from Judd who stated that no treatment is of value except radical excision. The choice method of approach is the suprapubic. To this may be added the importance of removing the obstruction at or below the vesical orifice. As with many modern surgical procedures the perfected technique has been developed by the trial and error method.

Pean in 1895 and Czerny in 1898, were the first surgeons to successfully remove diverticula. Riedel performed an excision in 1903; Pagenstecher and Von Eiselberg in 1904; Young reported three cases of excision in 1904. Complete excision was done eight times thus far. Pagenstecher operated by resection of the sacrum. The fistula healed slowly and reopened again. In the early cases no record of the condition of the vesical orifice appears. In all cases where examination for residual urine was recorded, residual urine was found. With the advent of the cystoscope, study of obstruction of the vesical orifice began to be noted in reports.

Kutzman quoted a case from Lennander, a boy 21 months with acute retention for which cystotomy was performed. A diverticulum was found and the septum tied with a ligature which resulted in failure. At a second attempt, the septum was clamped. The immediate postoperative result is not given and the boy eventually died of kidney infection. Young cut the orifice in one case and sutured the margins. He reported improvement but 300 cc. of residual urine remained. Pausson recommended suture of the orifice without excision. This was done in one case but the end result was not given. L. Jungren anastomosed the diverticulum and bladder in one case in a boy of 12 years. Cabot in 1910 reported 10 cases which were treated by radical excision and described the method of packing the diverticulum with gauze to facilitate removal. Marion in 1913, split the bladder down to the diverticulum and excised it. In 1922, Geraghty described a procedure which changed a tedious and difficult operation to a relatively simple one, applicable in a certain number of cases. He incised the bladder mucosa at the neck of the diverticulum and stripped the mucosa from the sac wall. Young modified this operation by in-

serting a glass tube into the diverticulum and using suction to invaginate the mucosa before resection. The wounds should be drained intravesically and extravesically. One may conclude from these studies that the intravesical approach with invagination of the mucosa of the diverticulum is the method of choice when possible; otherwise the extraperitoneal, extravesical method of resection must be used. A word of warning may here be given. All diverticula do not lend themselves to removal by invagination of the mucosa. One should not attack the problem unless he is competent to perform the extravesical removal in case of failure of the more simple procedure.

Technique of Extravesical Extraperitoneal Diverticulectomy. The technique of the operation consists of first performing a suprapubic cystotomy. With the bladder opened, the diverticular orifice should be located and a definite plan of attack outlined. One may stretch the orifice and insert the finger to get an idea of its size and ramifications. The diverticulum may be packed full with gauze as described by Cabot, or a diverticuleve as described by Howard may be attached to the finger and inserted into the diverticulum to facilitate manipulation, or the diverticulum may be removed without inserting anything into its cavity. The peritoneum is next stripped away from the vertex of the bladder and this procedure continued until it has also been removed from the diverticulum if possible. If this procedure is impossible an incision may be made in the peritoneum and the diverticulum lifted upwards and extraperitonealized by attaching the free edge of the peritoneum below the orifice of the diverticulum. The location of the ureter should have been previously outlined if possible, by the use of urography or by inserting a catheter into the ureter after the bladder is opened.

The removal of the diverticulum is a difficult, long, and tedious operation and the surgeon must use constant care to avoid injury to vital structures. The walls of the diverticulum are frequently firmly adherent deep in the pelvis in the region of the iliac vessels. Injury to the ureter, iliac vessels, and the vas deferens must be avoided. By carefully carrying the dissection around the entire diverticulum one reaches a point where the diverticulum is entirely free with the exception of its attachment to the bladder. When this point in the operation is attained, the diverticulum should be excised from the bladder and the opening in the bladder closed with chromic catgut sutures. The original incision in the bladder is next closed. A mushroom catheter should be left in the bladder. The space lateral to the bladder should be drained and the space of Retzius should be drained. The abdominal incision may be closed in the usual manner.

CASE REPORT

Case No. 397247, Cook County Hospital, Mr. C. H., aged 62 years. The patient was admitted to the hospital, November 18, 1933, with acute retention of the urine. Inability to urinate was present for 3 months. His family physician inserted an indwelling catheter which was worn for the greater part of the time. Two weeks previous to admission, hematuria developed. Previous to the onset of retention nocturia was present 4 times a night for the past 6 or 8 months. Previous to that nocturia was present once a night for the past 5 or 6 years and had gradually increased to 4 times. Diurnal frequency was not disturbed.

The temperature was 98, pulse 86, respiration 20, and the blood pressure 144/78. The essential findings of the physical examination were as follows: The prepuce was markedly edematous from the presence of the indwelling catheter. Rectal examination revealed a prostate moderately enlarged; indurated to the second degree; the left lobe larger than the right; the median furrow deep; the lateral sulci distinct; the seminal vesicles not palpable and the intervesicular notch normal.

A No. 21 cystoscope passed with difficulty and 300 cc. of residual urine was found. Marked trabeculation and diffuse cystitis were found so that a careful examination was postponed until bladder irrigations somewhat relieved the cystitis so that a better view could be obtained. On December 12, 1933, cystoscopic examination was repeated. Marked trabeculation of the bladder wall was found and the opening of a diverticulum in the bladder wall was seen well above the trigone on the left side. This opening had a sphincter like orifice and could easily be overlooked in the presence of the severe cystitis. The P. S. P. test showed 40% excretion in the first hour and 35% in the second hour. The blood urea nitrogen was 28.45 mgm. per 100 cc., and the creatinin was 2 mgm. per 100 cc. Because of inability to retain an indwelling catheter, intermittent catheterization was resorted to. On December 12, 1933 diverticulectomy was performed by the extravesical extraperitoneal method. On December 22, 1933 the urea nitrogen was 22.30 mgm. per 100 cc. of blood and the creatinin was 1.7 mgm. per 100 cc. of blood. On January 3, 1934 a suprapubic prostatectomy was performed.

The pathological report was as follows: Gross examination revealed a sac like structure 14 cm. in diameter forming a spherical diverticulum. The surface

was covered with occasional fibrous tags. The wall was 5 mm. thick.

Microscopic examination revealed a diverticulum of the urinary bladder composed of mucosa and muscular layers.

The pathological examination of the prostatic tissue removed revealed a prostate 3½ x 3½ x 1 cm. consisting of 2 lateral lobes and a posterior commissure. The suprapubic wound continued to drain urine and on March 10, 1934 a secondary closure of the fistula was performed. Following this the wound rapidly closed and the patient was discharged from the hospital on April 8, 1934.

Cystoscopic examination following discharge from the hospital revealed absence of residual urine, a normal bladder mucosa, practically complete disappearance of trabeculation and a well healed bladder wall where the diverticulum had been resected. The urine examination was normal. The suprapubic wound was well healed.

104 S. Michigan Avenue.

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COLLAPSE THERAPY OF PULMONARY TUBERCULOSIS

MINAS JOANNIDES, M.S., M.D., F.A.C.S.

Associate in Surgery, College of Medicine, University of Illinois

CHICAGO

Tuberculosis is the most common and the most insidious of all diseases. All of us here have sometime or other in our lives been infected with tubercle bacillus. It is true that only a certain small percentage of us will die of tuberculosis. The remaining majority have or will develop a sufficiently great immunity against the organism of tuberculosis to survive the effects of the infection and die from some other cause. Being, therefore, such a common infection it behooves all of us to consider its various aspects in the hope that, as practitioners of medicine, we may prolong a few lives.

The limitations placed upon the time for this presentation will not allow a lengthy discussion on the bacteriology, nor on the pathology of this entity. Prevention and treatment of pulmonary tuberculosis should be based upon a thorough knowledge of the peculiarities of the organism and the reactions set up by the animal body in order to overcome this invasion. We have not as yet reached close to the ideal in the treatment of tuberculosis of the lung. It is true that we have made progress but not enough as yet to hope for cures. We should look forward to some means of attacking the tubercle bacillus before it has played havoc on the lung tissue. At the present time the patients that come for treatment are those who already show signs of lung destruction. We may follow the National Tuberculosis Asso-

From the Department of Surgery, College of Medicine, University of Illinois, Chicago, Illinois, and the Pneumothorax Clinic, Municipal Tuberculosis Sanitarium, Chicago.

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ciation classification and call a case minimal or moderately advanced just for the sake of following an accepted standard, but we all know that at these stages the lung has reached the stage of destruction and the tubercle bacillus has embedded itself into the tissues in such a way as to lie dormant for many years and possibly strike back again whenever the resistance of his host has been lowered. We must not, therefore, hope for cures in tuberculosis, but we can look forward to quieting or arresting the progress of the disease. Collapse therapy of tuberculosis with the aid of other means for increasing the resistance of the patient offers the greatest hope at the present time.

The advantages of collapse therapy are manifold. This mode of treatment reduces the time of invalidism and, therefore, is of definite economic importance. The sooner a tuberculous patient is rehabilitated, the sooner he will earn a livelihood and thus be no longer a charge on his friends, relatives or the State. Due credit must be given to Dr. Frederick Tice and Dr. A. J. Hruby, directors of the Chicago Municipal Tuberculosis Sanitarium, for launching a second and very important aspect in the prevention of tuberculosis. They emphasized the public health aspect of collapse therapy and to this extent have developed a collapse therapy program planned to be carried out on a large scale. Admitting that every open case of pulmonary tuberculosis is a dangerous source of infection, and assuming that one open case due to carelessness or ignorance may infect a large number of others, it is obvious that every possible means must be drafted to break such a contact. Because Chicago deals with the problems presented by the majority of other large cities in our country let us discuss the situation as it is in this city.

There are in Chicago at the present time three large institutions that are supported by the taxpayers and have a total capacity of about 2,000 beds available for tuberculous patients. There are approximately about 5,000 open cases in Chicago who cannot be hospitalized because of lack of space in the free tuberculosis hospitals. These carriers come in daily contact with infants, with children, and others who from overwork or overplay have a lowered resistance. In spite of the Glacklin act which operates in Illinois, these patients cannot be isolated and, therefore, we cannot easily break the contact. These patients are usually poor and cannot avail themselves of the opportunities for care offered by private hospitals or sanatoria. It is obvious, therefore, from a public health viewpoint that the sooner these patients become sputum negative the easier we may control the spreading of tuberculosis.

I will not burden you with an exposition of the historical development of collapse therapy. It would be injustice and disrespect to the efforts of many great men who have devoted a lot of their time to the development of collapse therapy, if we did not mention such names as James Carson, Friedrich and Brauer, Wilms and Sauerbruch, Carlo Forlanini, John B. Murphy, Emile Rist, Willy Meyer, Carl A. Hedblom, Hans Jacobeus, Howard Lillienthal, Chevalier Jackson, Evarts A. Graham, John Alexander, and Gale and Middleton. These men and a host of lesser known workers have paved the way by stepping stones so that collapse therapy is no longer on an experimental basis. By their untiring efforts these men have laid the foundations for the new and rapidly developing specialty of thoracic surgery. I look forward to the time when no one would hope to undertake the care of a tuberculous patient unless he is well trained in the science and art of thoracic surgery.

The theoretical basis for collapse therapy is the induction of topical rest in the lung. It is obvious that even when the patient is at absolute bed rest that he has to breathe from 20 to 30 times per minute or 120 to 180 times per hour or 3,000 to 4,300 times per day. It is necessary, therefore, for this lung to expand and contract an equal number of times. The lung, because of the continuous respiration, is forced to continue working even though the remaining parts of the body are at rest. Rest is the basis of treatment in most ailments. In the case of a gastric ailment we limit the food intake to give that stomach its necessary amount of rest and give it a chance to recuperate. In the case of a fracture or dislocation we splint the extremity to allow it to rest. Why not then use some means for lung splinting to aid in its recovery? We have definite clinical evidence that the body itself is aiming in that direction in the case of pulmonary tuberculosis. A natural attempt at limiting lung activity can be noted by the retraction of the ribs on the diseased side. Intrathoracically we

also note a displacement of the mediastinum or the diaphragm or both when lung pathology is present. But because the chest wall is fairly rigid there is not a sufficient splinting in most cases to bring about a quiescence or an arrest of the pathologic process. It is for this reason that a mechanical collapse of the lung becomes necessary to accomplish the desired effect. Besides inducing local or topical rest, collapse therapy causes tuberculous cavities to close and in some cases to heal. Closure of cavities is of great importance because the amount of sputum becomes diminished and eventually disappears. Because the positive sputum is the most important source of infection the spreading of tuberculosis will be diminished by this result. Furthermore, positive sputum may be spilled in other parts of the lung particularly of the opposite side and cause a bronchogenic extension on that side. This source of danger is eliminated when the amount of sputum is reduced to a minimum. We know from experimental evidence that the lymph in the lung is propelled to a great extent by the expansion and contraction of the lung. Immobilization of the lung will, therefore, prevent the circulation of toxic and infected lymph which may induce signs of toxemia and keep the resistance of the patient at a low level.

The indications for collapse therapy are essentially the same for all procedures. An ideal case for collapse therapy would be one with a unilateral type of a lesion which shows a tendency towards fibrosis and retrogression of pathology. We know, however, that such a case, although ideal, is extremely rare and that most patients present a varying degree of bilateral pathology and a tendency towards a progressive lesion. It is this type of lesion that may kill promptly and it is in this type of patient that something must be done to check the progress of the disease. If a carefully controlled course of collapse therapy is instituted in this type of a case, the progress of the lesion will be checked and another life may be prolonged. Because this type of lesion is quite common and because artificial pneumothorax collapse offers the greatest hope, this form of therapy consequently becomes the most popular. It has the added advantage of being relinquished if the patient cannot tolerate collapse therapy.

From a technical viewpoint it is the simplest and the least shocking form of treatment. With a little preliminary training anyone who knows the essentials of aseptic technic should be able to do pneumothorax collapse. Certain technical difficulties such as intrapulmonic injections of air, the amount and frequency of air injections, etc., have to be adapted to each individual case. Suffice it to say that one should prefer to give more frequent injections with lesser amounts and more negative end pressures in the pleural cavity. In this manner he will always stay on the safe side and complications such as hydro or pyopneumothorax, or air embolism will be avoided. Bilateral pneumothorax may be of value in a certain group of patients, but this type of therapy should be carried out with a greater caution, and a more careful follow up. All patients with early lesions or progressive lesions should be treated with pneumothorax and not be subjected to any of the permanent collapse procedures until there is sufficient evidence of retrogression of the lesion. Any of the other procedures used will be determined by the individual case and the hobbies of the surgeon in the case. Some prefer pneumolyses while others do thoracoplasties. It matters not which procedure is used as long as the pathologic lung is satisfactorily collapsed and the patient has not been subjected to any unnecessary shock.

At the pneumothorax clinic of the Municipal Tuberculosis Sanitarium of Chicago in a total of 642 cases who received 11,530 injections from June 1, 1931, to November 1, 1933, the following end results may prove of interest. There were 73 per cent conversions from positive into negative sputum in the minimal cases as contrasted with 32 per cent conversions in far advanced cases. Likewise the patients who received collapse therapy for less than 6 months showed only 23 per cent conversions as compared with 76 per cent conversions in those who received treatments for one year or more. The following tables are given because of their comparative value. These figures include patients at the pneumothorax clinic up to August 1, 1933.

PNEUMOTHORAX CASES BY DIAGNOSIS:

	No. of Cases	No. of Pos. Cases	No. Conversions	Per Cent. Conversions
Minimal	24	15	11	73%
Moderately advanced	202	158	77	49%
Far advanced	203	180	58	32%
Total	429	353	146	41%

NUMBER OF CONVERSIONS FROM POSITIVE TO NEGATIVE CASES:

	Total Pos. Cases	Total Conversions	Per Cent. Conversions
Artificial pneumothorax	353	146	41%
Pneumothorax with phrenic	84	28	33%
Phrenic cases	62	12	19%
Total	499	186	37%

PNEUMOTHORAX CASES BY LENGTH OF TIME UNDER TREATMENT:

	No. of Cases	No. of Pos. Cases	No. Conversions	Per Cent. Conversions
Less than 6 mos.	244	210	48	23%
6 mos. to 1 year	86	69	42	61%
1 year or over	99	74	56	76%
Total	429	353	146	41%

These figures when analyzed show that the earlier the diagnosis and treatment is made the sooner the sputum is changed from positive to negative sputum. A comparison of the figures in patients who are moderately advanced and those who are far advanced shows that the percentage of conversion is diminished by almost 40 per cent when the patient is neglected so that his pathology progresses from the second stage to the far advanced stage. It should be noted that the figures show the combination of artificial pneumothorax and phrenic nerve resection denote patients in whom artificial pneumothorax alone could not produce the desired effect. In other words 33 per cent of the conversions produced by the combination of artificial pneumothorax and phrenic neurectomy represent patients who would have gone from bad to worse and eventually die of tuberculosis. Likewise, the figures for phrenic neurectomy patients represent those in whom artificial pneumothorax was either unsuccessful or the condition of the patient was such that artificial pneumothorax might have proved dangerous to the patient. Nineteen per cent of these patients have been converted from positive to negative sputum. This series of figures shows that one cannot depend entirely upon the use of one single method of collapse to produce the desired effects. With reference to the length of time necessary to carry on this treatment it is evident from the figures that the longer the treatment is carried out the greater the percentage of conversions. The optimum length of treatment for artificial pneumothorax is about fifty-five months or more. Unless there is definite reason for discontinuing artificial pneumothorax collapse this treatment should be carried on until there are definite signs of healing. It is frequently necessary to resort to oleothorax in cases where there is a persistent expansion of the lung so that the intrapleural pressure rises very promptly to a dangerous level with the introduction of only small amounts of air. In such type of cases where the lung still shows definite evidence of pathology either oleothorax or one of the radical procedures should be resorted to in order to produce a satisfactory result.

It is obvious from the foregoing facts that collapse therapy is of definite value to the patient. It not only aids in the cure of the patient but it also prevents the spreading of the disease by the elimination of local tuberculous areas and also the conversion of a positive into a negative sputum. In closing one must emphasize the careful selection both of the patient and the surgeon for this type of therapy. The patient should have a tendency towards a retrogressive lesion and the surgeon should not only be armed with technical skill but should have an open mind and a kind heart so that he can put himself in the patient's place before making a decision. In this way the complications will be minimized, the cures will be increased, and collapse therapy will accomplish its purpose.

3810 Broadway.

DISCUSSION

Dr. M. Pollak, Peoria: We are trying to evaluate our results from collapse therapy by studying the mortality rates. In our institution, we are using collapse therapy since the early part of 1930. We have compiled the mortality curve of tuberculosis for the City of Peoria since the year 1920. I would like to show some slides giving our results.

In the year 1920, when the city had a population of about 76,000, we had 55 deaths from pulmonary tuberculosis with a mortality rate of 72.25 per 100,000. In 1929, when the population had increased over 100,000, we had 63 deaths with a mortality rate of 61.71 per 100,000, and in 1933 the number of deaths was 34 and the mortality rate 29.85, showing that since collapse therapy was started in 1930, the mortality rate from pulmonary tuberculosis has decreased in our city over fifty per cent.

In order to evaluate what influence the work of the Sanitarium had on the mortality, we have divided these deaths into two groups: The first group comprises the deaths which occurred outside of the Sanitarium, and the second the deaths which occurred in our institution and plotted the respective curves beginning with the year 1920. We found that the curve of the first group was practically flat from the year 1925 to 1931, inclusive, while in the second group the curve dropped down steeply from the beginning of 1930. When during 1932

more deaths have occurred in the Sanitarium than in the previous year and the curve of the second group shows an upward trend, the curve of the first group dropped down steeply, and in the year 1933 both curves became practically flat again at about the same level as during the previous year. This chart, we believe, shows that in 1930 and 1931, the number of deaths has decreased because fewer deaths have occurred in the Sanitarium. In 1932 and 1933 when the number of deaths in the institution has increased (and we have to add here that patients are admitted to the Sanitarium in all stages of their disease), the number of deaths has decreased outside of the institution. On the basis of these findings, we believe that the extensive collapse therapy we are practicing since 1930 was greatly instrumental in the decrease of the number of deaths from pulmonary tuberculosis in our city.

Dr. S. L. Governale, Chicago: I would like to ask Dr. Joannides the relative efficiency of thoracoplasty in the axillary line in comparison with thoracoplasty confined to the paravertebral line.

Dr. Minas Joannides, Chicago (closing): In answer to the question of Dr. Governale, I wish to state that it makes little or no difference which route is followed for the resection of ribs. The primary object in thoracoplasty is to get a sufficiently good collapse of the diseased lung. Either the posterior route may be followed or the axillary or anterior route. It is, of course, essential to insist on the multiple stage operation as originated by Dr. Hedblom. If the posterior route does not produce a satisfactory collapse then one must remove more portions of the ribs by the axillary or anterior route. Most of the pathology being in the apex it is very necessary to resect as much of the first rib as possible.

In closing I wish to again emphasize the necessity of early recognition of tuberculosis. Most patients do not come for treatment until very late. Many of them wait until there is a positive sputum or definite destruction of lung tissue. As you will note from the results of conversion from positive to negative sputum, the earlier the case receives treatment the more likely the patient is to become sputum negative.

AN OLD TIME DOCTOR

E. O. Laughlin, M. D.

PARIS, ILL.

Recently there fell into my hands the original day book of Dr. John Ten Broeck, who practiced medicine in this county nearly a hundred years ago. I can recall him vaguely as a man of impressive bearing and build, with heavy brows and a patriarchal gray beard, staunch and stern in his ways—true to the type of the legendary country doctor.

Under present conditions a review of this old time doctor's records, wherein every entry is meticulously made in ink, including medicines dispensed as well as fees charged, is peculiarly interesting. Enlightening, too, are his occasional brief comments. For his services he sometimes received cash, but more often apples, eggs, oats, notes and whatnot.

The record begins in May, 1840, and ends in 1842. The first entry reads: Alfred A. Fields, To Tr. Rhei Comp., three ounces, and Soda Comp., $1.00. Another, May 19, John Holston, To visit daughter, bleed and purgative $1.62½; to phial Med. 37½ cts. May 27, Abijah Paine, To phial Med. and Emplastrum picis Burgundi, $1.00, and in brackets the comment, "ran off." May 28, a Mr. Tilford was debited to one phial of eye water, 25 cts. He proved ungrateful, too, and his failure to pay evidently sank deeper into the doctor's soul, for he comments in this case: "Ran off—the puppy!" May 30, Bart Whalen was charged with 12½ cts. for camphor, and at a later date 6¼ cts. Thomas Wisemore incurred a debt of $2.50 for visit to daughter and paregoric. But Judge Connely, who must have lived nearby, paid but 50 cts. for a visit to his wife, and later only 25 cts. On August 27 is the entry, John Crawford, To visit Hermaphrodite, $1.00. No treatment or comment is appended.

Another entry: Wm. Flood, To bleed wife, 25 cts.; another: Thomas McCord, To extracting tooth, 25 cts. David McCord was assessed $5.00 for the reduction of a fractured arm. One of the highest fees recorded was for appling cups nine times, $11.00. Within the period of two years covered by the records, many obstetrical cases were entered, for those were prolific times. For these the invariable entry was: To attention wife, accouchement, $5.00.

To us the fees received by the old time doctor seem absurdly small. But evidently he was a good collector, taking his patients' notes for small amounts, and accepting all sorts of produce. And the cost of living was quite low. One patient is credited with $4.60 for 23 bushels of corn; another with 26 cents for four dozen eggs; still another with 67½ cents for "water melons." Sooner or later, as the book shows, he managed to collect 90 per cent. of his fees, such as they were. The doctor led a plain, simple life, because life was perforce plain and simple in those good old days. And so, with fees ranging from 6¼ cents to $11.00, he accumu-

lated a goodly competence and left a substantial estate.

One cannot put the ancient record aside without noting the therapeutics of the times. Bleeding and cupping were everyday procedures. Ointments and plasters were much in vogue, while quinine, calomel and castor oil were the drugs most prescribed. Armed with this dependable trio and with opium, paregoric, senna, spirits of nitre, squills, tartar emetic, ammonia and camphor the good old doctor was ready to combat all the ills that flesh of the olden times was heir to. And that he was fairly successful is attested by the recurrence of many names of patients throughout the book.

HIGH VOLTAGE

An electrician returned home from work one night to find his small son waiting for him with his right hand swathed in a bandage.

"Hello, sonny!" he exclaimed. "Cut your hand?"

The boy shook his head sadly.

"No, dad," he replied, "I picked up a pretty little fly, and the one end wasn't insulated."—*Answers.*

Society Proceedings

COOK COUNTY ... ...

CHICAGO MEDICAL SOCIETY

Regular Meeting, Wednesday, January 9, 1935

LAY EDUCATIONAL PROGRAM

Overweight:

A Common Sense View of Overweight—Samuel Soskin, Director of Metabolic Research, Michael Reese Hospital.

Treatment of Overweight—George A. Harrop, Professor of Medicine, Johns Hopkins Hospital, Baltimore, Md.

Regular Meeting, Wednesday, January 16, 1935

Program presented by the Faculty of the Loyola University School of Medicine.

Introductory Remarks—Louis D. Moorhead.

CEREBRAL INFECTIONS

Diagnosis—Francis J. Gerty, Professor and Director of Division of Neurology and Psychiatry.

Medical Management—Victor E. Gonda, Clinical Professor, Division of Neurology and Psychiatry.

Surgical Management—Harold C. Voris, Associate Clinical Professor of Surgery.

Discussion: Italo F. Volini, George B. Hassin, Carl F. Schaub, A. Ettleson, Chester C. Guy.

Regular Meeting, Wednesday, January 23, 1935

BURNS—GENERAL PRACTITIONER'S NIGHT

"Treatment of Shock in Electrical Burns"—Hart E. Fisher, Chief Surgeon, Chicago Rapid Transit Company.

"Recent Advances in the Treatment of Burns"—Stanley J. Seeger, Head of Surgical Department, Milwaukee Children's Hospital.

"Surgical Repair of Tissue Defects and Deformities following Burns"—Sumner L. Koch, Associate Professor of Surgery, Northwestern University Medical School.

Discussion: Daniel E. Murphy, F. W. Slobe, Frederick B. Morehead, Albert Montgomery, Michael L. Mason, Arthur R. Metz.

Regular Meeting, Wednesday, January 30, 1935

BLOOD DYSCRASIAS

"The Recticulo Endothelial System"—*Richard H. Jaffé*, Pathologist, Cook County Hospital.

"The Recognition and Differentiation of the Anemias"—Russell L. Haden, Professor of Medicine, Cleveland Clinic, Cleveland, Ohio.

Discussion: I. Pilot, James P. Simonds, Arthur F. Byfield, Wm. H. Holmes, Victor Levine, Carroll Birch, Howard L. Alt, Gilbert H. Marquardt, George Scupham.

Marriages

JAMES SLOAN ALTMAN, Pittsfield, Ill., to Miss Florence Mildred Cleven, June 5, 1934.

ELLIS R. CRANDLE, Gorham, Ill., to Miss Virginia Lee Williams of St. Louis, Nov. 28, 1934.

JAMES E. P. DAVIA to Miss Elsie I. Crabtree, both of Chicago, June 16, 1934.

SAMUEL LOUIS GOLDBERG, Chicago, to Miss Gertrude Beatrice Marks, of Detroit, Dec. 24, 1934.

Personals

Dr. Oscar B. Nugent addressed the Lake College of Commerce at Waukegan, Ill., Feb. 1, on "Safeguarding the Eyes."

He will address the Champaign County Medical Society, Feb. 14, on "The Family Physician, Eye Specialist and Eyes."

Speakers before the Chicago Society of Allergy, January 21, include Dr. Michael Zeller on "Woods' Filter in the Diagnosis of Skin Reactions".

Dr. Otto Saphir, among others, addressed the Chicago Pathological Society, January 14, on "Anomalies of the Circle of Willis and Resulting Vascular Disturbances of the Brain".

Dr. Theodore N. Rafferty, Robinson, addressed the Crawford County Medical Society in Robinson, January 10, on "Intra-Abdominal Hemorrhage of Ovarian Origin".

Dr. Irving I. Muskat discussed "Tuberculosis of the Middle Ear in Pulmonary Tuberculosis,"

among other speakers, before the Chicago Laryngological and Otological Society, January 7.

Dr. Arnold Knapp, New York, addressed the annual meeting of the Chicago Ophthalmological Society, January 21, on "Present Operative Treatment of Detachment of the Retina in Europe".

The La Salle County Medical Society was addressed at La Salle, January 10, by Drs. Italo F. Volini, Chicago, on "Etiologic Diagnosis of Heart Disease," and Robert A. Black, Chicago, "The Rheumatic Heart in Children".

Dr. Anton J. Carlson, chairman, department of physiology, University of Chicago, spoke on "The Physiologic Aspects of Heart Disease" at the annual meeting of the Chicago Heart Association, January 8.

A joint meeting of the Chicago Orthopedic Society and the Chicago Roentgen Society was addressed, January 10, by Drs. Edward L. Jenkinson on "Bone Lesions" and Dallas B. Phemister on "Pathology and Diagnosis of Tuberculous Arthritis."

Speakers before the Chicago Surgical Society, January 4, included Drs. Ralph A. Kordenat on "The Relation of Anemia to Surgical Disease of the Gallbladder," and Charles F. Sawyer, "Factors Influencing Mortality in Appendicitis".

Dr. Robert B. Greenough, Boston, will deliver the eleventh Lewis Linn McArthur Lecture of the Frank Billings Foundation of the Institute of Medicine, February 22. His subject will be "Cancer Education in Medical Schools".

Prof. Ulrich Friedemann of the staff of the British National Research Council lectured at the Albert Merritt Billings Memorial Hospital on "Experimental Investigation on the Blood-Brain Barrier in Infectious Diseases".

Dr. Ludwig Fraenkel, professor and head of the department of gynecology and obstetrics, University of Breslau, Germany, gave an illustrated lecture before the Institute of Medicine of Chicago and the Chicago Gynecological Society, January 15; his subject was "Etiology, Diagnosis and Treatment of Parametritis".

Dr. Karl Meyer, medical superintendent of Cook County Hospital, has been named chief of the surgical staff of Henrotin Hospital; he will continue his duties at the county institution, with which he has been associated for twenty-one years.

Speakers before the Chicago Club for the Study of Arthritis, January 9, were Drs. Isadore Pilot on "Pathology of Gout" and Edwin P. Jordan, "Clinical Aspects and Relation to Chronic Arthritis". Dr. Emil G. Vrtiak gave a demonstration of slides and patients.

Dr. John D. Camp, Rochester, Minn., addressed the Peoria City Medical Society, January 22, on "Significant Roentgenologic Changes in the Spine," and January 15 the speaker was Dr. George E. Shambaugh Jr., Chicago, on "What Can Be Done for Sinus Disease?" Dr. George W. Parker was recently elected president of the society.

Speakers before the Chicago Society of Internal Medicine, January 28, were Dr. William S. Hoffman on "Relation of Serum Inorganic Sulphate to Renal Efficiency"; Dr. Franklin C. McLean and Albert Baird Hastings, Ph.D., "Clinical Observation of the Calcium Ion Concentration in the Blood," and Dr. Géza de Takáts, "Observations on Buerger's Disease".

At a meeting of the Chicago Council of Medical Women, January 4, Helen Koch, Ph.D., associate professor of child psychology, department of home economics, University of Chicago, spoke on "The Nursery School and the Mental and Physical Health of Young Children," and Ethel Kawin, psychologist of the laboratory schools of the University of Chicago, "Psychologic Problems Arising from Physical Illnesses in Children".

Sir Frederick Grant Banting, professor of medical research, University of Toronto Faculty of Medicine, approved the ordinance which permits unclaimed animals at the city pound to be used for experimentation, in a recent letter to the Illinois Society for the Protection of Medical Research. He stated that his research resulting in the discovery of insulin would have been impossible had he not been able to use dogs. The use of unclaimed dogs from the city pound for medical research was approved in a resolution adopted by the Chicago Heart Association at its annual meeting, January 8. The association declared itself opposed to the pending Nelson amendment, which would prohibit this use, and favored the continuance of the Arvey ordinance. Dr. Anton J. Carlson, professor of physiology, University of Chicago, was the principal speaker at the meeting.

News Notes

—Cook County Hospital cared for 70,427 patients during the fiscal year ended December 1, an increase of 153 over the number hospitalized in 1933. The daily average is 2,680 patients for 1934 as compared with 2,652 during 1933, according to the *Chicago Tribune*.

—For the first time in the history of Illinois, no cases of ophthalmia neonatorum were reported during the year ended July 1, 1934, according to the Chicago *Tribune*. The enactment of the law in 1933 providing for the use of silver nitrate solution in an infant's eyes immediately following its birth is credited with this result.

—The Beaumont Foundation, Cleveland, has made a grant to the University of Chicago for the support of research by Dr. Julius M. Rogoff on the suprarenal and other endocrine glands. Dr. Rogoff was formerly associate professor of experimental medicine at Western Reserve University School of Medicine, Cleveland.

—Dr. James F. Simonds, professor of pathology, Northwestern University Medical School, gave the first lecture in a series on cancer, sponsored by the cancer research committee of the Chicago Woman's Club. Dr. Simonds spoke, January 3, on "What Is Cancer? Its Biology and Pathology. Its Cause." Other speakers in the series include: Dr. Harry H. Oberhelman, assistant clinical professor of surgery, Rush Medical College, January 10, How is Cancer Recognized? Dr. Max Cutler, director of the tumor clinic at Michael Reese Hospital, January 17, Present Status of the Treatment of Cancer. Possibilities of Cure. Dr. Bowman C. Crowell, associate director, American College of Surgeons, January 24, Organized Movements for the Control of Cancer in the United States. Dr. Ludvig Hektoen, director, John McCormick Institute for Infectious Diseases, January 31, Cancer Research: Wiat Has Been Accomplished? Lines of Research for the Future.

—Figures from the state health department for the first eleven months of 1934 indicate that the demand for preventive vaccines increased as compared with other years. Nearly twice as much typhoid vaccine was distributed as in any previous year, enough to immunize 63,548 persons as compared with a previous high of 38,425. Sufficient toxoid to immunize more than 200,000 children, nearly twice the amount given out in 1933, vaccine to protect 165,490 persons against smallpox, and enough silver nitrate solution to give prophylactic treatment against eye infection to 103,708 new-born babies were distributed. Antirabic vaccine to treat 1,713 persons bitten by dogs and sufficient material to give the Schick test to 65,785 persons were furnished by the department.

—In a recent report of accidents in Illinois for the four years 1930-1933 released by the state department of health, it was stated that accidents account for one in every seven deaths in some counties, while in others only one in twenty-five fatalities is attributed to accidents. For this period, accidents were responsible for 23,905 deaths in Illinois, and of these 8,938 were charged to motor vehicle mishaps. For all accidents the highest rates prevailed in Alexander, Union, Christian, Morgan and Lake counties, in the order named, where the number of deaths ranged from 140 to 120 per hundred thousand of population. The most favorable rates prevailed in Menard, Pratt, Jasper, Wayne and Moultrie counties, where the annual losses averaged from 36 to 40 per hundred thousand of population. For motor vehicles alone Lake County had the worst record by a wide margin, 60 deaths per hundred thousand annually from automobile mishaps. Next in order were Edgar, with a rate of 49; DeKalb, 43; Will, 42; McLean, 41; Grundy, 40, and Kankakee, 40. Calhoun County was the only one in which no death was attributed to motor vehicles. The state at large had an average loss of 77 per hundred thousand from all accidents for the four years.

—A feature of the program before the Chicago Gynecological Society, January 18, was the report of the maternal welfare committee: Drs. Charles C. Rentfro on "Incidence of Ectopic Pregnancy in the Reporting Hospitals of the City of Chicago" and William Harcourt Browne, "Ectopic Deaths in Chicago for 1935".

—At a meeting of the Chicago Neurological Society, January 17, W. R. Ingram, Ph.D., and Charles Fisher, Ph.D., spoke on "Relation of Hypothalamicohypophyseal System to Diabetes Insipidus"; Dr. George W. Hall and George V. LeRoy, "Narcolepsy Following Head Injuries," and Dr. Roland P. Mackay, "Simultaneous Occurrence of Ependymoblastoma and Osteoblastoma in the Fourth Ventricle".

—A tumor clinic was conducted at the Veterans' Administration Facility at Hines, January 14, under the direction of Dr. Max Cutler, head of the tumor clinic at Michael Reese Hospital, Chicago, and consultant in tumors to the facility. Following the presentation of cases, Aristid V. Grosse, Ph.D., professor of chemistry, University of Chicago, spoke on "Recent Advances in Radioactivity and Artificial Radioactivity". An evening program was presented by the following physicians: Charles M. Griffith, medical director, U. S. Veterans' Administration, Washington, D. C., The Cancer Problem in the Veterans' Administration. Max Cutler, Tumors of the Breast—Diagnosis and Treatment. Walter C. Alvarez, associate professor of medicine, University of Minnesota School of Medicine, Rochester, Cancer of the Digestive Tract. A new specially constructed two gram radium "bomb," valued at $100,000, was displayed during the meeting.

Deaths

JOHN S. ALLEN, Keithsburg, Ill.; Hahnemann Medical College and Hospital, Chicago, 1877; for many years bank president and president of the board of education; aged 83; died, December 15, 1934.

CLEAVES BENNETT, Champaign, Ill.; College of Physicians and Surgeons of Chicago, 1896; a Fellow, A. M. A.; past president and secretary of the Champaign County Medical Society; formerly councilor of the eighth district of the Illinois State Medical Society; aged 64; on the staff of the Burnham City Hospital, where he died, December 22, 1934, of coronary thrombosis.

MILDRED JESSIE ROBERTS BROMAN, Evanston, Ill.; Rush Medical College, Chicago, 1916; aged 43; died, January 4, of pneumonia.

ROYAL OSCAR BROWN, Mount Morris, Ill.; Rush Medical College, Chicago, 1903; member of the Illinois State Medical Society; president of the Ogle County Medical Society; aged 60; died, December 15, 1934, in the Deaconess Hospital, Freeport, of coronary thrombosis.

ARTHUR CLARK DEAN, East St. Louis, Ill.; Jefferson Medical College of Philadelphia, 1917; a Fellow, A. M. A.; member of the South Dakota State Medical Association and the American Academy of Ophthalmology and Oto-Laryngology; fellow of the American College of Surgeons; served during the World War; aged 47; died, December 1, 1934, in St. Mary's Hospital.

BENJAMIN FELTENSTEIN, Chicago; College of Physicians and Surgeons of Chicago, 1895; aged 66; died, January 2, of coronary thrombosis and myocarditis.

EMMA HORTENSE GABEL, Chicago; Northwestern University Woman's Medical School, Chicago, 1900; aged 73; was found dead, December 19, 1934, of chronic nephritis and arteriosclerotic myocarditis.

SAMUEL HARRIS GANSER, Chicago; Reliance Medical College, Chicago, 1911; aged 48; died, December 23, 1934, of arteriosclerotic myocarditis and pulmonary edema.

OLIVER M. HEILIG, Millcreek, Ill.; Barnes Medical College, Chicago, 1895; aged 65; died, November 23, 1934, of carcinoma.

J. T. TICHENOR, Waterford, Ky.; Louisville Medical College, 1893; aged 64; died, November 17, 1934, of heart disease.

CHARLES F. HUBBARD, Chicago; Hering Medical College, Chicago, 1899; member of the Illinois State Medical Society; aged 60; died, January 1, of chronic myocarditis.

HENRY W. JOHNSON, Port Byron, Ill.; Hahnemann Medical College of Philadelphia, 1882; aged 80; died, November 25, 1934, of coronary sclerosis.

GEORGE WILLIAM KIMBALL, Coulterville, Ill.; National Medical University, Chicago, 1896; also a dentist and druggist; formerly village president and president of the board of education; aged 66; died, November 19, 1934, of chronic interstitial nephritis.

CHARLES H. KISNER, Oblong, Ill.; Medical College of Indiana, Indianapolis, 1895; member of the Illinois State Medical Society; aged 69; died, November 17, 1934, of angina pectoris.

SYDNEY KUH, Chicago; Universität Heidelberg Medizinische Fakultät, Heidelberg, Baden, Germany, 1890; a Fellow, A. M. A.; clinical professor of psychiatry, Rush Medical College; member of the American Neurological Association; past president of the Chicago Neurological Society; senior attending neurologist to the Michael Reese Hospital, attending alienist and chief of staff, Cook County Psychopathic Hospital, consulting alienist Chicago Lying-in Hospital; formerly attending alienist to the Sceleth Hospital, now known as the House of Correction Hospital; aged 68, died, December 27, 1934, of coronary thrombosis.

EDWARD CRAIG LEDMAN, Chicago; Starling Medical College, Columbus, 1903; aged 60; died suddenly, December 3, 1934, of coronary thrombosis.

CHARLES AUSTIN LESTER, Peoria, Ill.; Hospital College of Medicine, Louisville, Ky., 1897; served during the World War; aged 60; died, December 9, 1934, in the Veterans' Administration Facility, Hines, of arteriosclerosis and valvular heart disease.

ROY WHITE MCCLINTOCK, Chicago; Harvey Medical College, Chicago, 1904; aged 57; died, January 2, of coronary occlusion.

MICHAEL THOMAS NAUGHTON, Chicago; College of Physicians and Surgeons of Chicago, 1894; aged 67; died, December 12, 1934, in the Veterans' Administration Facility, Hines, Ill., of nephritis.

FRANK M. TEBBETTS, Chicago; College of Physicians and Surgeons of Chicago, 1885; aged 70; died, December 21, 1934, of chronic myocarditis.

JOHN ALLEN WHIPPLE, Peoria, Ill.; National Medical College, Chicago, 1895; also a dentist and a lawyer; aged 79; died, November 22, 1934, in the Proctor Hospital of acute nephritis.

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